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Pupil productivity, morale, and compliance have been analyzed as functions of teacher leadership independent of the question of whether or not the behavior of the teacher which was favorable to one of these effects in pupil behavior would also be favorable to another type of effect. Interrelationships of effects were studied with respect to the question: Does the teacher who achieves the greatest total learning gain also achieve high morale or compliance?

Measures of productivity, morale and compliance were considered in light of variables of sex, grade, age, initial achievement scores, geographic mobility, intelligence, socio-economic status, and previous history of cooperative or uncooperative behavior at school. Productivity was measured by a series of achievement tests. Pupil morale was measured on a set of questions included on a fall and spring questionnaire. Pupil compliance was measured in relation to requirements of task performance and classroom order.

The study revealed a significant relationship between teacher leadership and the three effects. Leadership functions were found to be scalable. The effects interacted so that the level of performance on any single dimension is dependent on the level of performance in the other two dimensions. These findings enable the researcher to specify the teacher leadership styles which maximize the greatest number of effects.

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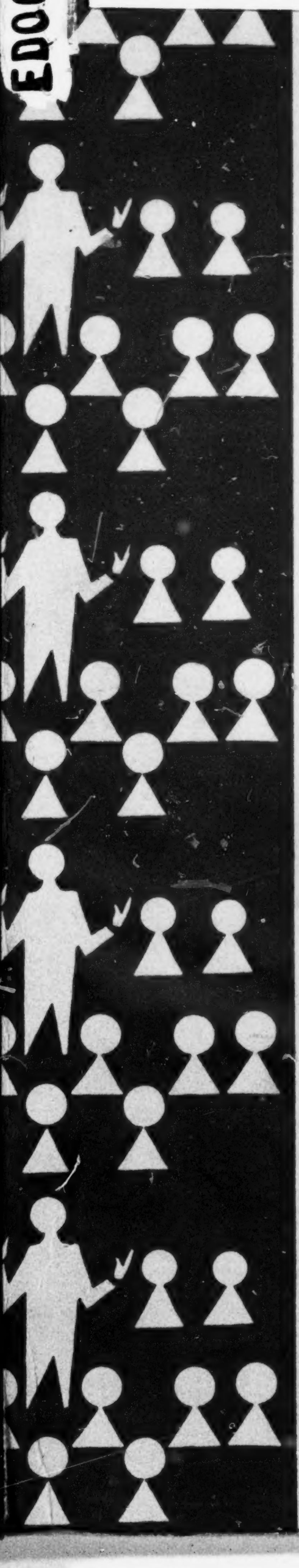

DIMENSIONS OF TEACHER LEADERSHIP IN CLASSROOM SOCIAL SYSTEMS

BY C. WAYNE GORDON AND LETA McKINNEY ADLER
ASSISTED BY JOHN D. McNEIL

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LOS ANGELES

DIMENSIONS OF TEACHER LEADERSHIP IN CLASSROOM SOCIAL SYSTEMS

PUPIL EFFECTS ON PRODUCTIVITY, MORALE, AND COMPLIANCE

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The various responsibilities for the study were shared among the authors in the following manner. C. Wayne Gordon, Principal Investigator, developed the theoretical framework, and directed the study throughout. Leta McKinney Adler served as Project Director during the first year of the study and as measurement and statistical consultant to its completion. John D. McNeil, Co-Investigator, helped in the initial planning of the study, contributed substantially to the theory and content of the task behavior scale, and wrote the review of studies in education in Chapter I.

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University of California
Los Angeles, September 1963

C. Wayne Gordon
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CHAPTER I

THE PROBLEM AND THEORETICAL FRAMEWORK OF THE STUDY

Several separate but related areas of inquiry have indicated a need for the study of classroom interaction with a focus on the behavior of the teacher which results in different effects on pupils. The most conspicuous, of course, are the vast number of studies of teaching in the field of education and related fields carried out for the purpose of improving instruction in the classroom. Two recent compilations of this research, document the enormous preoccupation with studies of classroom behavior as well as the broad scope and variety of approaches.[1,2] Among the many studies of this group there has been a substantial number which have analyzed social interaction in the classroom. Historically, this line of inquiry has included sociometric studies of group structures and its effects, child development and group climate, and social-emotional climates of classrooms. Within the last decade research on social interaction in the classroom has emphasized research on interpersonal perceptions, social climates, and teacher leadership styles. The studies of teacher leadership style are the studies in education to which this study is most directly related; the current study is a study of the relationship of teacher leadership to pupil productivity, morale, and compliance.

The orientation of the present study, however, draws from three additional influences, the studies of leadership and its effects on participants developed in social psychology, sociological studies of formal organizations in social anthropology and sociology, and recent studies in the area of the sociology of education.

Teaching as a Problem of Educational Research

Both the study of teaching as a phenomenon and the search for predictors of teacher effectiveness have long been subject to discussion by educators. As indicated in Barr's review[3] of nearly forty years of research in teaching, teaching effectiveness has generally been defined in terms of a rator's impression of a teacher. The usual practice has been to record impressions by marking a rating scale. Given the combination of differing expectations and biases among rators, the halo effect in rating, and the wide daily fluctuations in teacher behavior, there is little wonder that high ratings did not necessarily mean high teaching performance or even an accurate description of the teacher's actions.

Descriptions of Teaching

Recently, educators have shown a growing emphasis in their inquiries regarding teaching. They have begun to focus attention upon an analysis of the teaching act and to study teaching in its own terms. Their assumption is that a phenomenon must be described and analyzed before exploratory and predictive theory is possible. Hughes,[4] for instance, collected specimen records of a number of teachers each interacting in sequence with a child during a 30 minute period in which the teachers were asked to present a reading lesson in their most usual way, a developmental lesson in social studies or arithmetic. In this study, specimen records were in turn analyzed in terms of 31 functions subsumed under seven categories. That is, a teacher's particular actions or comments were categorized as, say, undertaken for purpose of control or for encouraging the child in his interest in subject-matter content.

Flanders[5] also developed observational techniques to assess the spontaneous behavior of the teacher. His techniques emphasized a system by which an observer classifies verbal statements (teacher and pupil) into one of ten categories once every three seconds. The major innovation of this system was that it permitted assaying sequence of behavior and gave attention to the factor of time in observation. Using his interaction technique, Flanders found that the attitudes of students toward the teacher and class were significantly more constructive in classrooms in which achievement was higher.

Smith and his associates[6] at the University of Illinois developed a system of analysis and isolated examples of classroom communication believed to illustrate sound logical processes as well as unsound, illogical processes in the teaching act.

An example of a recent attempt to overcome the difficulties of getting an accurate record of the teacher's classroom behavior is the teacher characteristics study directed by David G. Ryans.[7] This study employed trained observers using a rating scale in which items to be rated consisted of rather specific observable behaviors as opposed to those rating scales which included such vague qualities as "wholesome philosophy of life", "sincere courtesy of manner." Ryans also illustrated the importance of performing the statistical analysis necessary to determine that items would discriminate among teachers, items which do not refer to good and poor teachers alike or to behavior which no one exhibited. Although there is danger that general categories may unwittingly drag us back again to pedagogical terms which imply what teaching ought to be, it is noteworthy that Ryans found it desirable for theoretical advantages to arrange his specific behaviors under three interdependent dimensions: Pattern X (friendly, understanding, sympathetic vs. aloof, egocentric, restricted); Pattern Y (responsible, systematic, businesslike vs. unplanned, slipshod); and Pattern Z (stimulating, imaginative, surgent vs. dull, routine).

It is frequently asserted that programed instruction by which teaching is made a complex of knowledge is equivalent to a general theory of teaching. The problem of programing, including use of prompts, pacing, and reinforcement are problems common to all teachers. Because research in teaching has lacked a systematic way of describing the content of instruction and a way for relating structure of knowledge to the teaching process, it is sometimes suggested that the conceptual framework used to describe programed instruction will eventually enable one to describe the appropriate teaching acts to use in given circumstances.

Prediction of Teacher Effectiveness

Research in connection with the identification of elements of the teacher's classroom behavior which have a predictable effect upon pupil learning has been as difficult to conduct as that describing the teaching act. Construction of tests which will reveal all the changes in pupil behavior that teachers are trying to effect is a confounding task. Further, when these changes can be demonstrated, it is difficult to identify the specific teacher or element to which the change can be attributed. Nevertheless, there are important ideas which suggest that the problem of relating teacher behavior to pupil gains can be solved. Essentially these notions follow the strategy of (a) searching for relationships between the classroom actions of the teacher and the current and subsequent behaviors of pupils, (b) identifying the specific conditions under which a specified relationship between a pattern of teacher behavior and a pattern of pupil behavior occurs and (c) demonstrating that a teacher with known charac-istics will engage in the behavior under the given set of classroom conditions. Medley and Mitzel[8], for instance, have proposed a statistical and pragmatic approach in which they assume a straightforward atomistic relationship between teacher behavior and outcomes on the student. These researchers recognized that a particular teacher engaging in a particular way at a particular time does not have the same effect on all pupils. Medley and Mitzel employ a scheme in which teacher behavior is located according to its predictability for a range of pupils. Predictability is found by an approach following these steps: (a) finding the number of times each teacher exhibits certain behavior during a specified time, (b) measuring his effectiveness over the same period, and (c) determining whether or not the teachers who exhibit the behavior most frequently are the most effective ones.

Although pupil gain is admitted to be the most important way of measuring teacher performance, it has seldom been attempted because of the technical difficulties involved. There must be only one teacher for each class. Also, there is a strong belief that teacher behavior will evoke a certain amount of achievement with children of particular feelings and intelligence and a different amount of achievement with other children. It is easy to make the mistake of testing too narrowly for achievement. Cogan[9] contributed to the solution of the first problem by suggesting inquiry in self-contained classrooms and to the solution of the criterion problem by proposing measures of required and self-initiated work by students.

Heil and associates[10] categorized children and distinguished among types of teachers in an effort to determine what kinds of teachers had what kinds of effect on what kinds of children. On the basis of their responses to a feelings test, children were classified as "conformers", "opposers", "waverers", and "strivers". Although teachers were classified on the basis of classroom observations, responses to an interest (personality) inventory, role-playing test, and scores on the Teacher Education Examination, only the interest schedule yielded clear-cut results. On the basis of scores made in response to these instruments, teachers were classified as (a) "turbulent" (e.g., blunt, prefers independence from authority figures, engages in unconventional thinking, unmethodical), (b) "self-controlling" (e.g., methodical, ambitious, uses warmth and ingratiation in influencing others, submissive to superiors and demands same behavior from subordinates, yet is sensitive to feelings of others), and (c) "fearful" (e.g., protects self, seeks rules and is irritated when others break them, more comfortable in working with processes and things rather than with people, invites pupils to question his decisions and to express their own opinions and to confide in him as a parent, unable to inject structure).

Heil's results verified the major hypothesis that different kinds of teachers get varying amounts of achievement from different kinds of children. The self-controlling teacher got the most achievement from the several different kinds of children; the fearful teacher was associated with the least achievement. The turbulent teacher was almost as successful as the self-controlling teacher with children classified as conformers and strivers but less than half as successful with children classified as opposers and workers. Although the fearful teacher had the greatest achievement with strivers, the amount did not differ from that obtained by self-controlling and turbulent teachers. In terms of growth in friendliness, the fearful teachers actually achieved more gain than either turbulent or self-controlling teachers from children categorized as waverers. Fearful teachers also were at the top in terms of children's academic progress in social studies while the self-controlling teacher was superior in obtaining academic achievement and social acceptance. Children under his direction felt less free in their expression of feeling and were less self-reliant.

Experimental studies have also been conducted demonstrating the effects of different patterns of teacher behavior. Filson[11] showed that when the learning goals were unclear, as in a new task, lecturing and giving directions increased the dependence of pupil on the teacher. Amidon[12] found that the achievement by dependent-prone students in geometry was lower when teacher control was maintained by frequent use of lectures, directions, and criticisms. However, when the teacher's control was maintained by frequent use of questions, followed by the development of the students' ideas, achievement was higher.

Leadership Styles and Effectiveness

A popular approach to the study of teaching has been a comparison of contrasting styles of leadership, usually identified as "authoritarian" versus "democratic" or "teacher-centered" versus "pupil-centered". Some investigators have assumed that by his qualities as a leader and his abilities to exercise authority, the teacher is able to cope with problems of the classroom. Polar types of leadership, which isolate the characteristic behavior of different kinds of teachers, have been postulated. Table I-1. summarizes five representative studies dealing with leadership and the use of authority in the classroom, tying teacher behavior to pupil performance.[13]

The studies of teacher authority summarized in Table I-1, contain distinctions of leadership in the classroom that have common elements of control. These elements may be explicit or implicit. They relate to the different ways in which a teacher seeks to control the classroom environment. The studies actually show consistent theoretical formulations which center in clear-cut distinctions. There is institutional leadership and personalized leadership, dominative and integrative leadership, dictatorial and democratic leadership, authoritarian and laissez-faire leadership, and subject-matter, guidance, and creative leadership. Willard Waller[14] was interested in control; Harold Anderson and his colleagues[15] in the effects of the type of teacher authority on children's behavior; Wilbur Brookover[16] was concerned with the role of the teacher and with learning; R. N. Bush[17] with teacher-pupil relationships; and the Lippitt-White group[18] with the impact of a varied social atmosphere on group life and individual performance.

Table I-1. SUMMARY OF FIVE TEACHER LEADERSHIP STUDIES WITH EFFECTS ON PUPILS

Author	Leadership Type	Teacher Behavior	Pupil Behavior
Lippitt-White	Authoritarian	Determines all policy Dictates techniques and activity piecemeal Dictates particular tasks Assigns work companions Personalizes praise and blame Remains aloof from group	Higher-quantity production, lower quality Lower morale, more interpersonal conflict, aggression, scapegoating Less sustained work without leader present
Lippitt-White	Democratic	All policies a matter of group discussion and decision Teacher or leader assists with decision Steps to goal derived from discussion Leader suggests alternative means and procedures Members choose work partners Leader 'objective' or 'fact'-minded in praise Leader tries to be a member of the group	Highest morale, less interpersonal conflict, less aggression, less scapegoating More sustained work without leader present Lower quantity, higher-quality production
Lippitt-White	Laissez-faire	Complete freedom for group or individual decision Materials supplied by leader Leader supplies information only when asked Complete nonparticipation of leader Infrequent spontaneous comments on members' activities No attempt to appraise or regulate the course of events	Low morale and low productivity

Table I-1. SUMMARY OF FIVE TEACHER LEADERSHIP STUDIES WITH EFFECTS ON PUPILS

Author	Leadership Type	Teacher Behavior	Pupil Behavior
Anderson	Dominative	Teacher interrupts child who has given an expression of goal Pupil decisions unsolicited and child is expected to conform	Domination in teacher incited domination in pupils, looking up, playing with foreign objects, conforming to teacher domination, non-conforming to teacher domination
Anderson	Integrative	Child treated as a person, is accepted as he is Child can make mistakes without blame Teacher works with pupil to common goal Absence of coercion by teacher In teacher-initiated contacts no pressure is made on child	Integrative behavior in teacher incited integrative behavior in pupils; pupils make voluntary suggestions; more total social contributions
Waller	Institutionalized leader	Maintains social distance Conforms rigidly to institutional pattern or authority Personalities have to conform to pre-existing patterns Based on pattern of dominance and dependency Prestige attaches to the office of the institution leader	None established

Table I-1. SUMMARY OF FIVE TEACHER LEADERSHIP STUDIES WITH EFFECTS ON PUPILS

Author	Leadership Type	Teacher Behavior	Pupil Behavior
Waller	Personalized leader	Leadership arises from the interaction of persons Group subordinates self to leader Personalities of classroom determine the social pattern Prestige attaches to person rather than the office Social distance is not necessary Authority and power of the individual leader determines kind of personal leadership	None established
Brookover	Dictatorial, unfriendly	Dominating and aloof Tends to set himself apart from his students and maintain certain social distance from them	A positive relation between student's rating of teacher rigidity and mean gain in information on history test
Brookover	Democratic,	Friendly, congenial teacher attempts to associate with the pupils as a companion and helper	A negative relation between student ratings of teacher permissiveness and average gain in information on history test

Table I-1. SUMMARY OF FIVE TEACHER LEADERSHIP STUDIES WITH EFFECTS ON PUPILS

Author	Leadership Type	Teacher Behavior	Pupil Behavior
Bush	Subject matter teacher	Seeks task as developing intellectual aspect of student Firmly controls class by using direct methods Requires high standards at all times for all students Emphasis on mastery of information, generalization, and skill outlined in advance Teacher tries to achieve great competence in his field in order to be a better teacher	None established
Bush	Guidance teacher	Teacher has goals defined in terms of personal and social growth of the students; teacher is less concerned with knowledge of subject matter Classroom control is flexible and indirect Activities less verbal, more manipulative	None established
Bush	Creative teacher	Teacher attempts to spring the creative potential in students He follows school curriculum, but not when it interferes with a special interest on the part of the student His control fluctuates from one extreme to the other; his approach is emotional, sensitive, and artistic	None established

Each of these formulations indicated an harmonious pattern. Each reflected the common elements present as they pertained to the problem of coordinating interaction in the classroom. The concepts disclosed the tendencies of the institutional requirements and the demands of the personal realm. They suggested the familiar problem of how to link the goals of individuals with personal interests to the goals set for them in the institutional environment.

Although the five studies have suggested the relationship between types of leader performance and its influence on those whom it leads, there has been no conclusive evidence or even consistent findings to demonstrate how a teacher may behave to produce the desired effects on pupils. One analysis of 49 experimental studies in which authoritarian leadership was compared with democratic leadership concluded that the authoritarian-democratic juxtaposition did not provide an adequate conceptualization of leadership behavior.[19] Some of the 49 studies reported contradictory observations about the effects of the two different types of leadership on production and morale. Eleven of them found greater learning in learner-centered groups, 13 reported no differences, and eight concluded that teacher-centered methods were superior. The analysis noted additionally that these studies all compressed the complexity of group life into a single dimension. The fact is, however, that group organization has many facets and all of these must be understood to do full justice to its intricacy. Therefore, to avoid regarding leadership as an abstraction, a difficulty of previous leadership studies, the problem of authoritarian versus democratic leadership must emerge from the elements of the social system, its goals and functions.

The foregoing review of literature of the research on teaching relevant to the present study indicates the status of teaching techniques and effects. It suggests new approaches to the study of teaching and points up the need for better conceptualization of the teaching process and related criteria of effectiveness.

As one consequence, the present investigation deals not with "Who is the good teacher?" -- the fruitless question which leads only to the answer that the good teacher is a good person. Rather the question is raised, "How are particular leadership dimensions and their associated modes of teacher performance related to critical effects on pupils?" The chief criticism of prior research on teaching is that the studies have lacked a theoretical framework by which the investigations can be related and they have not been undertaken with a view to determining how one method or system would lead to superior learning, but merely to find out if one style is superior.

The present study makes an effort to shift from emphasis on psychological and pedagogical virtues to the sociological formulation of the problem. It seeks tentative principles of teacher leadership style that may contribute to (a) a theory of classroom teacher leadership including necessary methodological accouterments such as systematic observation of teacher behavior within discrete categories over a long period of time and (b) a selection of measures of multiple effects of teacher behavior, such as morale, achievement, and productivity.

Sociological Studies of Leadership

In addition to the educational studies of teacher behavior several additional studies, primarily sociological and social psychological, represent empirical and theoretical convergence of the studies of types of leadership and the relationship between these types and the behavior of the followers. Morris and Seeman developed a conceptual framework which focuses on explaining the effects of leadership, taking the behavior of the leaders as given.[20]

The Survey Research Center of the University of Michigan studied the relationship between the actions of supervisors and the workers under them in several types of work situations.[21] The procedure was to classify workers by groups as high productivity or low productivity. Compared to low productivity supervisors, high productivity supervisors spent more time in planning and less time working with their subordinates. They obtained higher morale and higher productivity. High productivity supervisors also were more employee oriented and less production oriented than low. The general finding indicated was that the combination of efficient executive functions with concern for the individual results in high productivity and high morale.

As part of the Ohio State Studies, Halpin and Winer in a study of aircraft commanders, as rated by their crews, found two dimensions as empirically relevant to the behavior of the followers.[22] Those were consideration and initiating structure. Consideration was related to "behavior indicative of friendship, mutual trust, respect, and warmth in the relationship between the aircraft commander and his crew". It was negatively related to "authoritarian and impersonal" behavior by the leader. Initiating structure measured the extent to which the aircraft commander "organizes and defines the relationship between himself and the crew". Halpin found the the commanders who had high scores on both consideration and initiating structure obtained high performance and high morale from their crews.[23]

Halpin's study is of great interest for the current study since it provided a measurement of behavior rather than polarized persons into leadership types, the advantage being that a leader may have a score for each separate dimension at the same time, i.e., high on both, low on both, or any combination of scores.

While neither the studies of teaching nor the studies of leadership in other formal organizations has led to any clear basis for study, a theoretical and empirical convergence is well indicated.

Hanan Selvin studied the relationship between the exercise of authority and "unofficial" behavior, demonstrating the influence of "leadership climate" on a wide range of unofficial behavior.[24]

Along with the above researches indicated as background to this study, the perception of the problem of classroom integration and the conceptual framework assumed to be necessary for its analysis derived directly from two previous empirical studies.[25] The first was a study of the social system of a high school; the second was the pilot study to this research, a study of teacher leadership systems in seventh grade classes and their effects on pupil achievement.[26]

The study of the high school conceptualized the classroom as a situation in which the teacher faces the problem of resolving the conflict inherent in trying to influence the actions of pupils who are organized both by the expectations of the formal organizations of the school and the expectations of the informal system of organization. In each of these systems, pupils are obliged to maintain status among their peers. Added to the inhibitions and controls over pupils inherent in the social organization in which they are involved are the additional liabilities to teacher influence related to pupil characteristics such as age, sex, mental ability, and cultural background which render teacher influence problematical. Furthermore, the conditions within which this action at the pupil level is integrated are problematical for the teacher at another level because of the impingement of the various expectations and controls from administration, from the pupils' families, and from colleagues. The result is a social situation of utmost complexity for the teacher and one for which a range of adaptations are made. In the theoretical discussion at the end of this chapter the problem of classroom integration is developed in some detail.

The Pilot Study

It was this version of the classroom as a complex social system that a pilot study on the effects of teacher leadership investigated in 1958. Having also arrived at objections to previous conceptualizations of teacher leadership similar to those of Anderson, we turned to certain concepts inherent in the social system formulations of Homans,[27] Bales,[28] and Parsons,[29] and in the studies reviewed above, to formulate our conceptions of teacher leadership. Three concepts were developed which seemed to represent the conceptual similarities and continuities of the various studies; namely, the dimensions of task, authority, and expressive, concepts equally derivable from sociological studies of social organization.

The orientation to task was conceived as the efficient administration and programming of the school work which was assumed to be specific to learning. This involves an orientation to supervising the completion of work, and punctuality and regularity in response to work demands. The authority orientation was to centralized control over decision, interaction, and activity according to the rule of uncritical acceptance of the teacher's right to decide. The expressive orientation was to the satisfaction of pupils by meeting the needs of pupils by personally administering learning to maximize satisfaction and minimize dissatisfaction.

Behavior in the classroom, both teacher and pupil, was assumed to be most adequately explained within the conceptual framework of the classroom as a social system.

Teacher leadership style was assumed to be manifest in modes of classroom integration which cope with several problems at the same time; namely, learning attainment, morale, and compliance to the expectations of work and classroom order. It was further assumed that the usual concepts of leadership employed for classroom analysis were abstractions inadequate to deal with the conceptual and empirical complexity of the problem.

It was assumed that teachers would differ in the behavior they selected to coordinate the classroom activity and that these behavioral differences were indicators of general uniformities. The uniformities in behavior among teachers furthermore would be general dimensions on which stable classifications of different samples of teachers could be made.

Finally it was assumed that the variation in leadership styles would produce variable effects on pupils in learning, compliance, and morale.

The basic problem of the research for the pilot study was to investigate how teacher reliance on the various dimensions of integrative behavior, or combinations thereof, effected certain aspects of pupil behavior. The three principal effect variables were (1) gain in mastery of subject matter as measured by gain in scores on standardized achievement tests--namely, the California Achievement Test for Reading, Writing, and Mathematics; (2) pupil morale, i.e., the degree to which pupils express positive or negative feelings toward school in general, their school work, their relationships with their classmates, and their teacher, and (3) pupil compliance, the degree to which the teacher has succeeded in influencing pupils to meet classroom expectations as measured by compliance with required assigned work.

The pilot study was an investigation of 38 teachers with 1,400 seventh and eighth grade pupils in self-contained classrooms. The variables investigated were the dimensions of teacher leadership, pupil achievement, pupil compliance to assigned work, and pupil morale. The study sought to place some of the problems relating to the teacher role in a sociological framework and to relate some sociologically relevant dimensions of the teachers' behavior to effects on pupils, as well as to gain experience in conducting such a study in a school system and to determine whether or not the teacher leadership dimensions were scalable by Guttman scaling procedures.

The results of the pilot study will not be systematically reported here since it has been in part previously reported. Rather the purpose is to show its relationship as background to the current study and to indicate the findings which have been used to formulate the hypotheses of the study and to provide the methodological basis for the definitions and measurement of the teacher leadership dimensions and pupil performance and morale variables.

The 38 teachers studied were characterized with respect to their use of the three dimensions of teacher behavior, orientation to task, authority, and expressive behavior. This was done on the basis of pupil observations as reported in a group-administered questionnaire. It seemed appropriate to consider the teacher's behavior as it was perceived by the pupils since it is the pupils' behavior which was to be related to the teacher's role. Also, it was felt that the introduction of an observer into the classroom situation might affect the teacher's performance.

The pupils were asked to answer a series of questions relating to the teacher's classroom behavior and the activities carried on in the classroom. These questions were in the form of statements with a standard check-list of responses: never, a few times, many times, always. The teacher score on each item was the median response of his pupils. From these scores the following three Guttman scales were produced to measure the orientation of each teacher to task, authority, and expressive behavior.

Task Orientation Scale. The following items constituted those selected as indicators of a task orientation, listed from the item on which fewest teachers were task-oriented to the item on which most teachers were task-oriented.

121. The teacher makes sure we complete all assignments.

91. In class we talk only about school work.

99. The teacher makes sure we learn facts.

110. The teacher starts the class on time.

84. Our report card grade depends upon our test scores, papers and reports.

101. The teacher sticks to the subject.

A task scale composed of six items had a coefficient of reproducibility of .90, half the scale error introduced by item 84, which produced a non-scale type of teachers classified as task-oriented on 101 and 110, but who did not grade on test scores, papers, reports alone.

Expressive Orientation Scale. The following items were found to produce a scale (again listed from the item on which the fewest teachers were expressive to the item on which the most were expressive) with a reproducibility above .90.

100. The teacher wants us to use our own ideas rather than those in the book.

124. We tell the teacher about personal things we do outside of school.

86. Our report card grade depends on the improvement we show.

118. The teacher talks with us about things we are doing outside of school.

117. The teacher gives attention to those who need special help.

120. When we do something wrong, we know we will get another chance; it won't be held against us.

97. When we express our own opinion, the teacher looks at both sides and talks it over.

Authority Orientation Scale. The following items, listed from the item for which fewest teachers were high in authority to the one on which most were high in authority constituted a Guttman scale.

59. The teacher tells us what the committee should do and how to do it.

72. We get permission before sharpening our pencils.

98. When we suggest some good new ways of doing things, the teacher lets us do them that way.

67. When we start new work in this class, the teacher asks us to help in planning it.

54. We work in committees.

64. The teacher lets us know that he will do something for us when we do what he asks.

Among items included in the scale, item 64 and item 72 scaled rather poorly. The latter produced a non-scale type of teachers otherwise in the most authoritarian type who let their pupils sharpen their pencils without permission. Item 64 had an unsatisfactory improvement ratio.

The coefficient of reproducibility for the six-item scale was .87, the two items above (64 and 72) being the only ones with a coefficient below .90.

When the 38 teachers were classified on the three scales described above the relationships among the scales expressed in some previous assumptions were found to be incorrect. More specifically, it was found that task-orientation and expressive-orientation were not polar points on a continuum, but had a low but positive correlation, $\gamma = .22$. More interestingly, among 15 teachers classified as having a high degree of orientation to task, 14 were highly or moderately expressive in their orientation to integration.

Similarly, an expected positive correlation between use of authority and task orientation failed to materialize. A γ of $-.40$ was found between these dimensions. Of the 17 highest authority teachers, only three were classified as task-oriented, whereas 12 of the 21 non-authority teachers were classified as task-oriented.

As was expected expressive behavior and authority behavior were found to be negatively correlated with $\gamma = -.46$.

The following partial correlations were obtained among the leadership variables:

$\gamma = -.40$ was obtained between task-orientation and authority, holding the expressive dimension constant. Holding expressiveness scores constant did not change the correlation coefficient.

$\gamma = -.58$ was obtained between authority scores and expressiveness scores, holding task-orientation constant. Thus, holding task constant increased the amount of negative relationship.

$\gamma = .04$ was obtained between task-orientation and expressiveness scores, holding authority scores constant. Thus, holding authority constant reduced the amount of relationship.

Interrelationship of the Dimensions. The 38 teachers were classified into modes with respect to the three dimensions. Of the 12 modes theoretically possible, five contained 31 of the teachers. The various permutations of the three dimensions shown in Table I-2. were produced when the 38 teachers were classified according to:

Dimension	Level with Scale Scores
Task	High (4-7) Low (1-3)
Authority	High (5-7) Low (1-4)
Expressive	High (6-8) Middle (3-5) Low (1-2)

No teachers were observed in two modes, and only one in three other modes.(Table I-2) Contrary to the initial assumption a high degree of orientation towards both task and authority appeared to be functionally incompatible. High task teachers tended to rely on the expressive rather than the authority orientation. Low task appeared to be highly compatible with high authority at the expense of expressive behavior.

Relationship between Teacher Dimensions and Achievement Gain in the Pilot Study. When the relationships between the various permutations of the leadership functions (task, authority, expressive) and achievement gain on the California Achievement Tests in Reading and Mathematics were examined, the two combinations which were found to be positively related to gain were high task, low authority, middle expressive and high task, low authority, high

Table I-2. TEACHER LEADERSHIP MODES DEFINED BY COMBINING THE SCORES ON THE THREE LEADERSHIP ORIENTATION SCALES, 38 TEACHERS IN THE PILOT STUDY

TASK			Low (1-3)		High (4-7)	
AUTHORITY			Low (1-4)	High (5-7)	Low (1-4)	High (5-7)
EXPRESSIVE	High (6-8)	N	5		5	1
	Middle (3-5)	N	2	6	7	1
	Low (1-2)	N	2	8		1

expressive (significant at the five percent level). The relationship held for both reading gain and mathematics gain combined.

Since the measures for pupil morale and compliance were less satisfactory than the measure for gain, the findings held more tentatively and are not discussed though they were used in the formulation of hypotheses for the current study.

The experience of the pilot study gave rise to several assumptions about the relationship of teacher leadership behavior and its effects on pupils which have been employed in the current study both in theory and measurement which are made explicit in the following chapters of this report, particularly Chapters II and III.

The Theoretical Framework for the Bay City Study

The concepts of teacher leadership dimensions as employed in this study are derived from the concept of the classroom group as a social system differentiated as external and internal systems as initially employed by Homans,[30] to which Parsons[31] added the notion of functions. Without entering into the polemics of functional discussion the dimensions of teacher leadership defined as task, authority, and expressive are accepted as terms which represent consistency and continuity in the analysis of human behavior within complex social organizations whether they are related to other such terms as dimension, leadership, function, system problem, goals, or other such terms. They are used here to dimensionalize aspects of the social system from which consequences in other parts of the system result.

The dimensions of teacher leadership as used are assumed to bear some relationship to both the external and the internal system of the classroom. Teachers hold pupils accountable for those expectations of learning achievement for which they in turn are accountable. Pupils are controlled principally through the grading system; teachers likewise are evaluated favorably to the extent that their pupils meet standard expectations of learning achievements as these are measured on standardized tests. Accountability to agents external to the classroom controls and governs to a considerable extent the goals, activities and the social interaction of the classroom. In effect the goals and activities of a classroom at any grade level are set for it by some higher grade in the system, and the attainment of these goals is ultimately accounted for above or outside the classroom. Any level of a system, for example the high school, exercises an external control over the elementary school below. So the sixth grade gives the fifth grade its expected reading level of achievement. In this way the tasks of the classroom are defined. Goals define activities, and the division of labor within the activities sets the learning tasks.

Goals of the Classroom System

Goal of Learning Achievement. Goals of learning achievement are easily operationalized for specified subjects such as arithmetic, reading, spelling, English. A second and more diffuse type of goals of learning achievement for which there are specific subjects and learning activities are those represented in areas such as social studies or citizenship, safety, education, and health. These goals are less easily operationalized and their attainment is less easily measured because the outcomes sought are behavioral outcomes of good citizens who act to insure safety and good health for themselves and others. The more functionally specific the goal, the greater the ease of organization of activity to attain and measure it; also, the greater the probable impact on the pupils. Stated otherwise, the greater the accountability to the system for goal attainment, the greater the accountability demanded of pupils, and the greater the impact on the pupils.

Goals for Social-Emotional Adequacy. A second group of goals are those that meet the social-emotional needs of pupils. They overlap with the goals above, but are less likely to be represented in specific subjects and activities, but inhere in the quality and nature of the interaction between pupils and teacher and among the pupils. These mental health and personality formation and development functions have increasingly become stated goals of the system. These goals are diffuse, not easily operationalized in activities whose outcomes can be readily measured. Nevertheless, the classroom system, though not held highly accountable, is assumed to achieve these goals.

Goal of Order. The goal of order is a system goal which is assumed to provide the conditions for the attainment of other goals. It also symbolizes the adequacy of the system and has implications for the socialization of pupils for "good conduct" both in and outside the school.

The Problem of Integration

The situation of goals and conditions presented to the teacher in the classroom within the context of the larger social system of the school, the community, and society is one in which the teacher must achieve the integration of action in the presence of quite conflicting and inconsistent tendencies.

In effect the problem in the classroom leadership is to achieve integration through means that will coordinate the interaction of pupils while they engage in various activities in such a way as to insure certain prescribed outcomes.

The requirements for the teacher set within the classroom context represent a situation in which the environment as outlined above conditions the adaptation which is made by the class as a group and for which the teacher is primarily accountable. It is in the sense which Homan has formulated the problem that the teacher adaptation is regarded:

> "We turn next from the environment to the behavior of the group itself; we note that the group is, at the moment we study it, persisting or surviving in its environment; and we infer, not unnaturally, that the behavior of the group must be such as to allow it to survive in the environment. Then we turn to the elements of group behavior; sentiment, activity, and interaction, and we say that the external system is the state of these elements and of their interrelations, so far as it constitutes a solution--not necessarily the only possible solution--of the problem: How shall the group survive in its environment? We call it external because it is conditioned by the environment; we call it a system because in it the elements of behavior are mutually dependent. The external system, plus another set of relations which we shall call the internal system, make up the total social system."[32]

For our purpose, the unit on which survival is at stake is the teacher as full custodian of responsibility and the system member to be held accountable. Only his membership is voluntary, only he can really fail. The pupils are recruits on a non-voluntary basis and not ultimately accountable, except to him.

The integrative problem is the resolution of numerous impingements on the teacher which arise from the effort to fulfill several functions simultaneously. This produces a two-fold impact. The first has a bearing on the attainment of the goals of the system and the second has a bearing on his personality in the classroom or school context. He appears to be pressed toward some adaptation which he can manage. He may try to maximize all functions; he may optimize, taking all into account; he may specialize in some system function; or he may settle the whole problem by specializing in his own maintenance through the use of authority, ritualized or programmed task, or the personalized management of pupil and parent relationships.

Confronted with thirty or forty reluctant "clients", the teacher must interact with them in a manner which will cause them minimally to accommodate their behavior to system goals or maximally to accept system goals as their own. The combination of behaviors by which the teacher attempts to harmonize pupil goals with system goals, we have called the teacher's mode of classroom integration.

The most sociologically relevant dimensions of mode of integration would appear to be the extent to and the manner in which the teacher employs task organization, expressive behavior, and authority in interacting with pupils. It was to handle the problem of integration that the selected dimensions were defined.

The Dimensions of Teacher Leadership

Task Dimension. The task dimension of teacher behavior refers to the extent to which the teacher organizes activity in the classroom in order to maximize specific goals in a program of learning. The emphasis is upon the application of clearly defined means to the specified goal. The behaviors selected for inclusion in the task dimension exemplify the principles of effective programming of learning as they are now understood on the basis of recent research. The principles emphasize the accumulative mastery of elements in the program so that new material is introduced only when the previous material in a learning sequence has been mastered. Learning tasks are programmed and supervised to completion. Material learned is repeated and reviewed. Information is repeated in new and alternative contexts to clarify and elaborate meaning. Pupils are involved in demonstrating what they have learned. Previously learned material is integrated into subsequent learning sequences. Pupils are shown when they respond correctly and how they are wrong when they are not correct.

Authority Dimension. By authority is meant the right of the teacher, granted him by the society by virtue of his status as teacher and adult, to control the actions of pupils in the classroom and to employ sanctions to enforce this control. This right is at least partially formalized by state law and the regulation through evaluation of him as a professional.

A teacher is considered high in the use of authority to the extent that he invokes the principle of uncritical acceptance as he initiates classroom activities and makes decisions. He is low in authority to the extent that he delegates the right to initiate activities and make decisions to the class, to committees, or to individual pupils, and to the extent that he qualifies his initiation and decision-making prerogatives by deferring to pupil opinion. Indicators of authority incorporate the following behaviors:

1. Centralization of authority in initiation of activity.
2. Centralization of authority in decision-making.
3. Qualification of authority by delegation to committees.
4. Delegation of authority through deferment to class consensus established by parliamentary procedures, voting or informal discussion in which teacher feels out opinions.
5. Qualification of authority through adjustment of interests: through bargaining, invoking positive rather than negative sanctions; crediting the interests of the pupils in the area of decision-making, through influencing efforts to gain mutuality of interest, by persuading and suggesting.

Some question remains whether the authority scale should move from maximum use of authority behavior to no employment of authority behavior, or whether the scale might be better conceived as a "control" scale which specifies what means of control have been employed as a substitute for authority, e.g., bargaining, persuasion, suggestion, or other forms of influence, it being understood that control through authority as defined is conceptually separate from the integration of the class achieved through task-orientation or expressive behavior; i.e., keeping the children busy or making them like the teacher. The current study uses an authority scale rather than a more general control scale. Authority in this sense is the specialization of the legitimate control centering in uncritical acceptance. General control derives from all of the dimensions. The negative and deprivational elements usually associated with authority are assigned to the negative end of the expressive scale.

Expressive Dimension. The expressive dimension is conceived as having high positive value when the teacher acts to maximize the interests of pupils. Such a teacher emphasizes those system goals which coincide with pupil interests and strives to achieve pupil identification with mandatory system goals through his management of activities and interaction in the classroom. He may do this by himself using warmth and affection in his interaction with pupils, by being helpful and fair, by crediting pupils' ideas, effort, and feelings. He may try to make his class enjoyable for pupils and to make the work interesting, varied and suited to the interests and capacities of different pupils.

The low end of the expressive scale extends to the violation of pupil interest and the deprivation of pupil need. Teachers at the negative end of the expressive scale may employ negative affect or be unfair and unkind in their relations with pupils.

The expressive orientation may be regarded as a pure theoretical and empirical type of leadership (Bales' popular leader) within the context of the self-contained expressive system, i.e., systems which deliver satisfactions to its members through relationships in self-contained activities or approximations of this in internal systems for all practical purposes here as autonomous, or nearly autonomously within external systems.[33]

More likely, within the classroom we have qualified expressive orientations, those that credit pupils' needs in imposing and administering system defined activities to achieve system goals. Integration is more frequently the guiding principle of the teacher's behavior rather than independently meeting needs. Teachers may specialize in the expressive orientation with the purpose of integration or independent of the integrative function. In a seventh grade classroom more commonly we should expect some coping with the integrative problem rather than independent expressive specialization; i.e., being liked as an end rather than being liked under duty. Indicators which define the expressive orientation emphasize the following principles:

1. Credits pupil expressed interest and derives learning activities from such interests.
2. Credits pupil interest in administering system prescribed activities and tries to maximize the adjustment of pupils to these activities.
3. Shows liking of pupils and seeks to be liked.
4. Relates to a broad scope of pupil interest both in learning and in personal areas.
5. Takes account of pupils' feelings and sense of justice.

The measurement of each teacher's level of performance on each of the three dimensions of leadership is discussed in Chapter II.

The assumption that classroom integration depends on the behavior of the teacher on each dimension implies the effect of the various combinations of behavior among the three dimensions at the same instance. This means that any teacher may be observed as located at some position on all three scalable dimensions. This combination is referred to as the teacher's mode of classroom behavior as measured. A mode represents a combination of scale scores on the three dimensions of behavior defined as task, authority, and expressive. Roughly any teacher may be characterized accordingly as low task, high authority, high expressive or any other combination of positions on the three dimensions.

Effects on Pupils

The dimensions and modes of teacher behavior constitute the independent variables for analysis. The related effects viewed as consequences of the mode selected by the teacher constitute the dependent variables of the study. These are productivity defined as pupil learning gain, pupil morale, compliance to work expectations, volunteer work, and classroom order and finally on over-all effect of classroom integration. These represent only some of the more obvious effects and exclude many other possible consequences from teacher behavior such as pupil innovation, creativity, problem solving, the formation and change of values.

The dependent variables defined for the study, like the dimensions of teacher behavior, are derived from the framework of the classroom on a social system. Specifically, they derive from the goals, functions, and conditions outlined above from which observational measures were defined accordingly:

Pupil Productivity. Pupil productivity is measured as pupil learning gain, the fall-spring difference between the pupils' performance on three achievement tests: reading, writing and arithmetic. Pupil learning gain is understood as evidence at the pupil and classroom level of the goal attainment of the school. Also, it is a variable related to the selected mode of teacher behavior.

Pupil Morale. Pupil morale is the degree of satisfaction expressed by the pupil with selected objects of the class or school situation. Morale is viewed as the state of satisfaction expressed as a result of various levels of goal attainment derived from the major force of the school and classroom system. In the study four morale variables are defined to specify pupil morale: school, work, peer, and teacher. The assumption is that something approximating a general morale results from the combination of morale from the various points of reference, and that among various classrooms the four kinds of morale may vary independently or may vary together depending on the mode of teacher behavior. The teacher is assumed to be the major agent productive of morale, but the mode of behavior determines the level of morale derived from school, work, and peer as well as teacher.

The four kinds of morale cover the satisfactions derived from both cognitive and affective processes. The affectively neutral sources of learning mathematics for instance may be equally as productive of satisfaction as the feeling-laden interaction with teacher and peer. Morale as an effect may vary considerably through time since a given mode of teacher behavior may result in a different morale effect, if it is sustained, than it produced at the outset. Also, the mode of teacher behavior itself may change through time resulting in different effects. Measures of morale were taken for both fall and spring to get at these bases for morale change.

Pupil Compliance. Pupil compliance as an effect is behavior which has two major implications for definition. One is the degree to which the pupil conforms to the defined expectations of the classroom. The second possible definition is to treat the extent to which the pupil engages in the expected activity itself as a measure of productivity, that is with its implied results in acquired values and competencies. In education it has sometimes been assumed that activity itself is a value. In this study learning gain will serve as the primary productivity measure and compliance will be defined as the extent to which the pupil meets the expectations of assignments. The actual measurement of the results of compliance is not undertaken except as it relates to the other observed effects.

Volunteer Work. Pupil volunteer work as implied is the activity the pupil engages in among a set of possible activities which he is not required to perform. Volunteer work should vary as an indicator of the nature of pupil involvement and as a function of teacher leadership mode. Some types of teacher behavior should be expected to encourage and some to discourage voluntaristic activity among pupils.

Classroom Order. Order is one of the expressed values of the classroom system; as an indicator of teacher effect it expresses the extent to which this system goal is being achieved. As a system goal it is assumed to facilitate the attainment of other goals and is presumed to epitomize the degree of both functional and normative integration. In relation to this assumption it is of interest to determine the relationship of teaching mode and classroom order. Order is treated as present when the pupils agree that their individual conduct and group conduct is positive.

Hypotheses to be Tested in the Bay City Study

The following hypotheses formulated the relationships which the Bay City Study was designed to investigate (each hypothesis is accompanied by an indexing number: the Roman numeral denotes the chapter in which the findings for that hypothesis are discussed, the Arabic number refers to the order of appearance of the hypothesis within the given chapter):

III-1 There will be a generally negative relationship between the scores for the teacher authority and task leadership dimensions.

III-2 There will be a generally negative relationship between the scores for the teacher authority and expressive leadership dimensions.

III-3 There will be a generally positive relationship between the scores for the teacher task and expressive leadership dimensions.

IV-1 Relationships between individual independent and dependent variables will be curvilinear; high scores on the expressive and task dimensions and low scores on the authority dimension will tend to be favorable to learning achievement. However, increasing use of expressive and task will either level off in effect on gain or become less effective.

IV-2 Gain will not be a linear function of the three leadership dimensions.

IV-3 Gain will be a function of the three combined dimensions of teacher leadership with the effect of a given level of performance on any one dimension depending on the level of performance on the other two dimensions.

V-1 High scores on the task and expressive dimensions and low scores on the authority dimension will be favorable to each of the specific types of morale as well as to general morale. This hypothesis indicates that the degree of specialization of task, authority, or expressive behavior will produce different degrees of morale of the various types, e.g., task behavior should produce work morale, expressive should produce teacher morale, authority should produce a negative effect on school and teacher morale.

V-2 Morale will be a function of the three combined dimensions of teacher leadership with the effect of a given level of performance on any one dimension, depending on the level of performance on the other two dimensions.

VI-1 The task and expressive dimensions of teacher leadership are positively related to pupil compliance to assigned work in both fall and spring. Authority is positively related to compliance in the fall and negatively related in the spring.

VI-2 Pupil compliance is a function of the three combined dimensions of teacher leadership with the effect of a given level of performance on any one dimension depending on the level of performance on the other two dimensions.

VI-3 The task and expressive dimensions of teacher leadership are positively related to pupil volunteer work in both fall and spring. The authority dimension is negatively related to volunteer work in both fall and spring.

VI-4 Pupil volunteer work is a function of the three combined dimensions of teacher leadership with the effect of a given level of performance on any one dimension depending on the level of performance of the other two dimensions.

VI-5 The task and expressive dimensions of teacher leadership are positively related to classroom order. The authority dimension is negatively related to classroom order.

VI-6 General class order is a function of the three combined dimensions of teacher leadership with the effect of a given level of performance on any one dimension depending on the level of performance on the other two dimensions.

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CHAPTER II

THE MEASUREMENT OF PUPIL PRODUCTIVITY, MORALE, AND COMPLIANCE

This Chapter and Chapter III deal with the methodology of the investigation. This Chapter will discuss the setting of the study and the measurement of effect variables. The following Chapter will discuss the measurement of teacher leadership.

The Study Setting and Sample

The School System

The school system selected for the study is referred to throughout the report as the Bay City School System. It was selected in order to standardize as many influences as possible that might complicate the measurement of teacher effects on pupils. First, it maintained the administrative and educational organization of the self-contained classroom for grades 1 through 8, in which only one teacher was in contact with the pupils. This insured the absence of influence of other teachers or adults at school which might account for pupil change. Second, the school system was large enough to provide a universe of teachers of the same grade large enough to provide for adequate statistical treatment. It had 79 teachers of seventh grade, six-seven, and seven-eight combinations in which about 2,700 pupils were enrolled through the year 1960-61. The educational philosophy and theory of instruction was relatively uniform throughout the thirty elementary school units through which the 79 teachers were distributed. The school administration was willing to cooperate in the study on condition that every teacher of the seventh grade was included in the study.

Pupil Universe

A total of 2,700 pupils were enrolled, either fall or spring, at the time data were collected. Classes which had experienced a change of teacher were eliminated from the study. The sample size of pupils varied according to the effect measure, including for each only pupils for whom both a fall and spring score was available. The reported sample size varies from 1,976 to 2,120 for different effect measures primarily because of pupil absences on different days of the data collection. In addition to changes of teacher, reduction in sample size, then, was due to late enrollments, transfers out of school, pupil absences, shifting of pupils from class to class, and, in the case of achievement test scores invalid scores. Invalid scores on the Sequential Tests of Educational Achievement (STEP) included those of students reported to be non-readers and those of a small number of students for whom gross irregularity in the test situation was reported by test administrators.

The samples of pupils on which regression analyses were done was further reduced by the elimination of pupils for whom any item of background information was missing. Teacher scores, however, are based on pupils in the study group for the effect variable in question, each coefficient having been computed on the basis of all pupils for whom information relating to the variable in question was available.

The Universe of Teachers

The unit of analysis was the teacher-class relationship. Data were collected in 79 self-contained classrooms of the seventh grade, or combination classes of seventh with sixth or eighth grades. Because of some changes in teacher assignments or pupil transfers the original 79 of the teachers and classrooms groups in the study were reduced to 74. The distribution of classes by grades were:

Grade	Number
7	34
6-7	17
7-8	23

The Data

Data for the investigation were collected in six phases. The measurement of productivity involved the administration of achievement tests in the first week of October and again in the third week of May. Fall measures of morale and compliance were obtained by means of questionnaire administered in a two-week period in November prior to Thanksgiving. The second questionnaire, administered at the beginning of June, 1961, included parallel questions with respect to morale and compliance. It also included the questions on which teacher leadership scores and class order scores were based. Questions with regard to the latter two variables were not included in the fall questionnaire, because it was feared that the reporting of information about the content of the questionnaire by pupils would indicate the nature of the study to teachers, possibly introducing a modification of teaching style as a result of this knowledge.

The data on the background characteristics of pupils were obtained at the beginning of the year from a questionnaire completed by the teachers on the basis of school records. At the end of the school year an investigation of pupil behavior provided some indication of the extent to which the pupils assigned teachers may have been atypically cooperative or uncooperative at the outset of the year.

Questionnaires and procedures for administering them were extensively pretested in order to insure that slow or poor readers could respond adequately. Comprehensibility of the questions was pretested by individual and group administrations of the questionnaire at fourth and fifth as well as sixth and seventh grade levels. For the study itself, each question was read aloud to the class by field workers. The latter, who included the authors, and mature graduate students with teaching experience were thoroughly briefed on standard procedures for administering the questionnaire. Teachers were not present in the classroom during the administration of questionnaires and every effort was made to measure pupils on the anonymity of their responses.

More complete descriptions of data and data collection procedures are included in the discussions of the measurement of individual variables in the remainder of this Chapter and in Chapter III.

The Adjustment of Variables

Since the study was an investigation of the relationship between teaching style and effect measures relating to pupils, it was necessary to take into account the possibility that differences observed for teachers might be attributed to the characteristics of the pupils assigned to their classes rather than to their teaching styles. A preliminary investigation was undertaken to determine whether or not classes did vary with respect to such pupil characteristics and to adjust teachers' scores on the effect variables to control statistically for such differences as appeared to be relevant.

It was assumed that pupil achievement, compliance, and morale might be related to the following pupil characteristics: sex, grade, age, initial achievement test scores, geographical mobility, intelligence, socioeconomic status, and previous history of especially cooperative or uncooperative behavior at school.

Geographical mobility was measured by the number of schools a pupil had attended prior to the year of the investigation. Intelligence quotient was measured on the California Test of Mental Maturity as administered by the school system for its own use during the sixth grade.

Socioeconomic status was inferred from the occupation of the head of the household. The source of this information was the first questionnaire, which included a series of questions describing the occupational activities of the principal wage earner in the pupil's family. Considerable time was allowed on instructions and questions from individual pupils concerning this section of the questionnaire. Occupations were coded according to the Dictionary of Occupational Titles.[1] Occupational status was measured on the following ordinal scale, involving minor revisions of the D.O.T. classification:

5. Professionals, managers, and officials. Owners of businesses were included when the presumption of several employees existed. (D.O.T. codes 0-0 through 0-3)

4. Semi-professionals, clerical, and sales persons. Owners of one-man or family retail establishments. (D.O.T. codes 0-4 through 0-6 and 1-0 through 1-9)

3. Skilled workers, including owners of businesses who engaged in skilled occupations in their own enterprises. (All D.O.T. codes beginning with 4 or 5)

2. Protective service workers, semi-skilled workers, and certain personal service workers (bartenders, housekeepers and cooks unless employed by private families, barbers, beauticians, manicurists, guides, midwives, and practical nurses). Owners of businesses engaging in these occupations in their own businesses were included. (D.O.T. codes 2-6, -21, -25, -26, -32, -36, -38; all codes beginning with 6 or 7)

1. Unskilled workers; domestic services workers; personal services, except those listed above; building service workers; porters; gardeners. (All D.O.T. codes beginning with 8 or 9, 2-0, 2-2 through 2-5 except as noted above; 2-8 through 2-9; and 3-40)

The presence of an unusual number of exceptionally disturbing or exceptionally cooperative pupils might affect the pupil performance scores of a given teacher through the effect of such pupils on general classroom integration. Pupils were identified as exceptionally cooperative or uncooperative on the basis of their behavior over a three-year period. An initial test was compiled by requesting the 74 teachers to select two groups of students: (1) those whom they felt contributed most to the solidarity of the group by their outstanding efforts, excellent cooperation, demonstration of leadership abilities, and general all around willingness to help; (2) those students who contributed most to the disunity or conflict present in the classroom, through disobedience, lack of effort, and general non-conformity to expectations. No specific number of students was requested; they were asked to provide one list for boys and one list for girls. The teachers provided a list of 300 conformers and 250 non-conformers.

Principals, vice-principals, and office clerks were then asked to describe those students on the teachers' lists whom they recognized by name and reputation, without being told in which category the teacher had placed them. Better than ninety percent of the students on the lists were recognized and placed in the same category in which they had been placed by the teachers. Those who were not known by the administrators, or not known well enough because they had only been in the school a short time were dropped from the lists. A search of the school records was the final step. Only those pupils whose records indicated consistency of rating as either outstandingly cooperative or uncooperative for the previous three years entered into the adjustment. For those whose records covered a three year period, it was found that better than ninety percent were retained.[2]

It was ascertained that there were significant differences among the 74 classes with respect to each of the above variables. When differences between class means (or proportions) and population parameters (all Bay City pupils included in the study) were tested for significance, it was found that for each variable more class values differed significantly (at both the five and ten percent levels) from the population parameter than would have occurred by chance; that is, than would have occurred had the pupils of Bay City been assigned to the 74 classes by random methods.

It was, therefore, thought necessary to introduce a statistical control of these variables. This was done, for variables treated as interval scale variables, by transforming observed mean class scores to residual mean class scores. Expected scores for each teacher were computed by use of the equation derived from a regression analysis of pupil scores.[3] A teacher's residual score represented the difference between the expected and observed class means of that teacher.

The regression analysis was done independently for pupils in classes composed entirely of seventh grades and for pupils in classes composed of two grades. Thus grade did not enter into the analysis for the former, but did for the latter. The consequence of this dual analysis was to score the teachers of these two types of classroom organizations separately. Thus, a score of zero meant that the mean score for the class of a given teacher equalled the mean score expected for a class with its type of organization and with its set of pupil characteristics.

The regression analysis was done with Bimed 34, a stepwise multiple regression computer program.[4] This program computes the regression by the usual method of least squares. The order in which variables enter the program is determined by the magnitude of their partial correlations with the dependent variable, holding constant variables already in the regression. To adjust a given score, only that group of pupil characteristic variables was included in the regression equation which predicted gain as efficiently as the total set of pupil characteristic variables.[5]

Regression analysis makes no assumption about the nature or distribution of the "independent variables" in the regression since they are treated as constants rather than variables. However, the residual values of the predicted variable are assumed to be normally distributed. When tests for normality by X^2 with seven degrees of freedom, residuals for gain scores and volunteer work were found to differ significantly from normal at the five percent level, while residuals for compliance with work-assignment scores did not. While the non-normality of residuals opened to question the accuracy of tests of significance, the use of residual scores seemed to make for greater accuracy in measuring teacher-effect than failing to adjust teacher scores for differences among their pupils. Where residuals are non-normal, it may be preferable to regard the procedure employed to obtain the restricted set of variables as an arbitrary one designed to eliminate from the regression those variables for which the coefficients were most likely to be fortuitous rather than to give the procedure its customary probability interpretation.

While findings are reported here only for adjusted scores, it was carried out as well for unadjusted scores. The findings were similar for both sets of scores.

The Measurement of Productivity

The productivity measure employed was the cognitive learning of the teacher's pupils as measured by gain in scores on achievement tests adjusted as described above. The STEP Test, or the Sequential Test of Educational

Progress was used, and the battery employed included Reading, Writing, and Mathematics.[6]

Form 3B of the three STEP tests were administered by teachers experienced in test administration. They were especially hired for this research project and were trained by psychologists from the Educational Testing Service. The classroom teachers aided in proctoring the tests. Every effort was made to obtain uniform and satisfactory testing conditions. Pupils were scored in the standard manner on fall and spring scores; and a gain score, the difference between spring and fall score, was computed for each pupil for whom a valid fall and spring test score was available. A difference between total scores for fall and spring was also computed. The STEP score used was the "Raw" rather than the "Converted" score.

Tables II-1 to II-3 present comparisons of the Bay City pupils tested with the norms established for the STEP test. The seventh graders tested represented the entire seventh grade of the Bay City system. The median and quartile scores for this group were identical with the test norms for the writing test and very close to the latter in the other two tests. Only those sixth and eighth graders in classrooms with seventh graders were tested. They also resembled the test norms closely. All three grades were slightly above reading norms; seventh and eighth graders were at writing norms, but sixth graders were a little below; all grades were close to mathematics norms.

Table II-1. MEDIAN AND QUARTILE "RAW" SCORES FOR BAY CITY PUPILS ON FALL STEP READING TEST, FORM 3B, COMPARED WITH FALL TEST NORMS

	6th Grade Scores[a]		7th Grade Scores		8th Grade Scores[a]	
	Bay City	Norms	Bay City	Norms	Bay City	Norms
Median	31	29	37	35	41	38
Lower Quartile	18	20	28	24	32	29
Upper Quartile	46	39	46	45	49	48

[a] Includes only 6th and 8th graders in multigrade classrooms.

Table II-2. MEDIAN AND QUARTILE "RAW" SCORES FOR BAY CITY PUPILS ON FALL STEP WRITING TEST, FORM 3B, COMPARED WITH FALL TEST NORMS

	6th Grade Scores[a]		7th Grade Scores		8th Grade Scores[a]	
	Bay City	Norms	Bay City	Norms	Bay City	Norms
Median	22	26	27	27	30	30
Lower Quartile	17	19	20	20	22	22
Upper Quartile	29	33	34	34	38	38

[a] Includes only 6th and 8th graders in multigrade classrooms.

Table II-3. MEDIAN AND QUARTILE "RAW" SCORES FOR BAY CITY PUPILS ON FALL STEP MATHEMATICS TEST, FORM 3B, COMPARED WITH FALL TEST NORMS

	6th Grade Scores[a]		7th Grade Scores		8th Grade Scores[a]	
	Bay City	Norms	Bay City	Norms	Bay City	Norms
Median	17	16	19	18	21	22
Lower Quartile	13	13	15	14	16	16
Upper Quartile	21	20	25	23	28	28

[a] Includes only 6th and 8th graders in multigrade classrooms.

The Sequential Tests of Educational Achievement are designed "to measure the outcomes of educational experiences, both formal and informal, from elementary school to college." The three tests are described as follows in the Fifth Mental Measurements Yearbook.[7]

Reading. The reading test calls for ability to understand direct statements, to summarize and interpret ideas, to see author motives, and to criticize passages with respect to ideas and purposes of presentation. The passages are intended to represent the major types of material which students are called upon to read.

Writing. The writing tests consists of critical evaluation of what others have written and,

> "It purports to measure 'ability to think critically' in writing, to organize materials, to write material appropriate for a given purpose, to write effectively and to observe conventional usage in punctuation and grammar."

Mathematics. The mathematics test attempts to measure "mastery of the following broad mathematical concepts: Number and Operations, Symbolism and Geometry, Function and Relation, Deduction and Inference . . ." The mathematics test places undue emphasis on the type of problem one is likely to encounter in a rather routine, everyday existence."

The zero-order correlations between the gain scores and the set of pupil characteristic variables used in the adjustment of scores are shown in Tables II-4 and II-5. The fall score for the test in question was the most highly correlated (negatively) with gain; other zero-order correlations were remarkable for the little relationship with gain which they demonstrated.

Despite these low zero-order correlations it was found that some of these variables accounted for a statistically significant amount of the residual sum of squares when the entire set of pupil characteristic variables was subjected to the stepwise multiple regression analysis. In Tables II-6 through II-13 are listed the restricted set of variables found to reduce the squared residuals for each score as efficiently as the total set. They are listed in the order they entered the regression.

Table II-4. ZERO-ORDER CORRELATIONS BETWEEN STEP GAIN SCORES AND PUPIL CHARACTERISTIC VARIABLES, 658 BAY CITY PUPILS, SEVENTH GRADE CLASSES

Pupil Characteristic Variables	Reading	Writing	Mathematics	Total
Sex[a]	.05	.02	.10	.07
Age	.05	.05	-.03	.04
Occupation of Head of Household	-.02	-.03	.05	-.01
Number of Schools Attended	.01	-.03	-.06	-.03
Number of Cooperative Pupils[b]	-.02	-.05	.03	-.03
Number of Uncooperative Pupils[b]	-.02	-.11	-.12	-.11
I.Q.	.01	.04	.16	.08
Fall Score	-.26	-.21	-.14	-.06

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[a] Males coded 1; females, 2.

[b] These observations were subjected to correlation analysis although they were not independent for pupils in the same class.

Table II-5. ZERO-ORDER CORRELATIONS BETWEEN STEP GAIN SCORES AND PUPIL CHARACTERISTIC VARIABLES, 807 BAY CITY PUPILS, MULTIGRADE CLASSES

Pupil Characteristic Variables	Reading	Writing	Mathematics	Total
Sex[a]	.01	.09	.00	.05
Age	-.10	-.10	.03	-.09
Grade	-.11	-.05	.04	-.07
Occupation of Head of Household	.07	.06	.11	.11
Number of Schools Attended	-.07	-.06	-.02	-.07
Number of Cooperative Pupils[b]	.00	.06	.07	.06
Number of Uncooperative Pupils[b]	-.09	-.02	-.01	-.06
I.Q.	.07	.07	.17	.14
Fall Score	-.31	-.16	-.13	-.07

---

[a] Males coded 1; females, 2.

[b] These observations were subjected to correlation analysis although they were not independent for pupils in the same class.

Table II-6. REGRESSION OF "RAW" READING GAIN SCORES ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 658 BAY CITY PUPILS, SEVENTH GRADE CLASSES

$$(Y = 27.54213 - 0.33888X_{FaR} + 0.20662X_{IQ} + 2.08758X_{Sx} + 0.13302X_{Ag})$$

Pupil Characteristic Variables	df	Mean Squares	F
Fall Reading Score	1	2661.37	49.37[a]
I.Q.	1	2088.60	41.11[a]
Sex	1	598.13	11.97[a]
Age	1	234.96	4.73[b]
Deviation from Regression	653	49.68	

Multiple Correlation Coefficient = .38

---

[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-7. REGRESSION OF "RAW" READING GAIN SCORES ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 807 BAY CITY PUPILS, MULTIGRADE CLASSES

$$(Y = -13.22225 - 0.37112X_{FRdg} + 0.20541X_{IQ} + 2.13013X_{Sx} - 0.55205X_{FOcc} + 0.06340X_{Ag} - 0.35378X_{NSA})$$

Pupil Characteristic Variables	df	Mean Squares	F
Fall Reading Score	1	4813.69	84.61[a]
I.Q.	1	3950.89	75.91[a]
Sex	1	765.56	14.96[a]
Father's Occupation	1	272.91	5.36[b]
Age	1	161.08	3.17
Number of Schools Attended	1	196.73	3.89[b]
Deviation from Regression	800	50.56	

Multiple Correlation Coefficient = .45

---

[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-8. REGRESSION OF "RAW" WRITING GAIN SCORES ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 658 BAY CITY PUPILS, SEVENTH GRADE CLASSES

$(Y = -26.64425 - 0.31994X_{FaW} + 0.16046X_{IQ} + 1.87589X_{Sx} - 0.35136X_{NUP} + 0.13033X_{Ag})$

Pupil Characteristic Variables	df	Mean Squares	F
Fall Writing Score	1	1345.46	30.06[a]
I.Q.	1	1262.89	29.43[a]
Sex	1	465.25	11.01[a]
Number of Uncooperative Pupils	1	330.45	7.90[a]
Age	1	225.17	5.42[b]
Deviation from Regression	652	41.54	

Multiple Correlation Coefficient = .34

---

[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-9. REGRESSION OF "RAW" WRITING GAIN SCORES ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 807 BAY CITY PUPILS, MULTIGRADE CLASSES

$$(Y = -2.41297 - 0.26099X_{FaW} + 0.10730X_{IQ} + 2.57397X_{Sx} + 0.22722X_{NCP}$$

$$-0.33235X_{FaO} + 1.42471_{Gr} - 0.08455X_{Ag})$$

Pupil Characteristic Variables	df	Mean Squares	F
Fall Writing Score	1	821.43	22.37[a]
I.Q.	1	1012.14	28.79[a]
Sex	1	1120.83	32.82[a]
Number of Cooperative Pupils	1	188.03	5.54[b]
Father's Occupation	1	112.42	3.32
Grade	1	77.24	2.29
Age	1	129.78	3.85[b]
Deviation from Regression	799	33.68	

Multiple Correlation Coefficient = .34

---

[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-10. REGRESSION OF "RAW" MATHEMATICS GAIN SCORES ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 658 BAY CITY PUPILS, SEVENTH GRADE CLASSES

$(Y = -4.76386+0.15681X_{FaW} -0.36034X_{FaM} +0.10974X_{IQ} -0.26868X_{NUP})$

Pupil Characteristic Variables	df	Mean Squares	F
Fall Writing Score	1	613.25	22.04[a]
Fall Mathematics Score	1	1517.16	59.38[a]
I.Q.	1	790.36	32.41[a]
Number of Uncooperative Pupils	1	192.59	7.98[a]
Deviation from Regression	653	24.13	

Multiple Correlation Coefficient = .41

---

[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-11. REGRESSION OF "RAW" MATHEMATICS GAIN SCORES ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 807 BAY CITY PUPILS, MULTIGRADE CLASSES

$$(Y = -12.38605 + 0.12253X_{IQ} - 0.44150X_{FaM} + 0.22950X_{FaW} - 1.70038X_{Sx} + 0.06005X_{Ag} - 0.35427X_{FrO})$$

Pupil Characteristic Variables	df	Mean Squares	F
Fall Mathematics Score	1	1845.32	71.81[a]
Fall Writing Score	1	1374.53	57.23[a]
I.Q.	1	630.35	22.55[a]
Sex	1	513.60	21.94[a]
Age	1	214.23	9.25[a]
Father's Occupation	1	126.02	5.47[b]
Deviation from Regression	800	23.04	

Multiple Correlation Coefficient = .45

---

[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-12. REGRESSION OF TOTAL "RAW" GAIN SCORES ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 658 BAY CITY PUPILS, SEVENTH GRADE CLASSES

$(Y = -56.71862 - 0.70756X_{NUP} + 0.32190X_{IQ} - 0.16188X_{FaT} + 3.40476X_{Sx} + 0.29242X_{Ag})$

Pupil Characteristic Variables	df	Mean Squares	F
Number of Uncooperative Pupils	1	1534.92	7.94[a]
I.Q.	1	841.26	4.37[b]
Fall Total Score	1	3525.32	18.83[a]
Sex	1	1514.01	8.18[a]
Age	1	1131.85	6.16[b]
Deviation from Regression	652	183.73	

Multiple Correlation Coefficient = .26

---

[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-13. REGRESSION OF TOTAL "RAW" GAIN SCORES ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 807 BAY CITY PUPILS, MULTIGRADE CLASSES

$$(Y = -8.92523 + 0.28705X_{IQ} - 0.15736X_{FaT} + 2.85976X_{Sx} - 1.12117X_{FrO} + 0.38896X_{NCP})$$

Pupil Characteristic Variables	df	Mean Squares	F
I.Q.	1	2783.31	15.45[a]
Fall Total Score	1	5857.06	33.83[a]
Sex	1	1526.50	8.90[a]
Father's Occupation	1	1293.19	7.60[a]
Number of Cooperative Pupils	1	576.98	3.40
Deviation from Regression	801	169.55	

Multiple Correlation Coefficient = .29

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[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

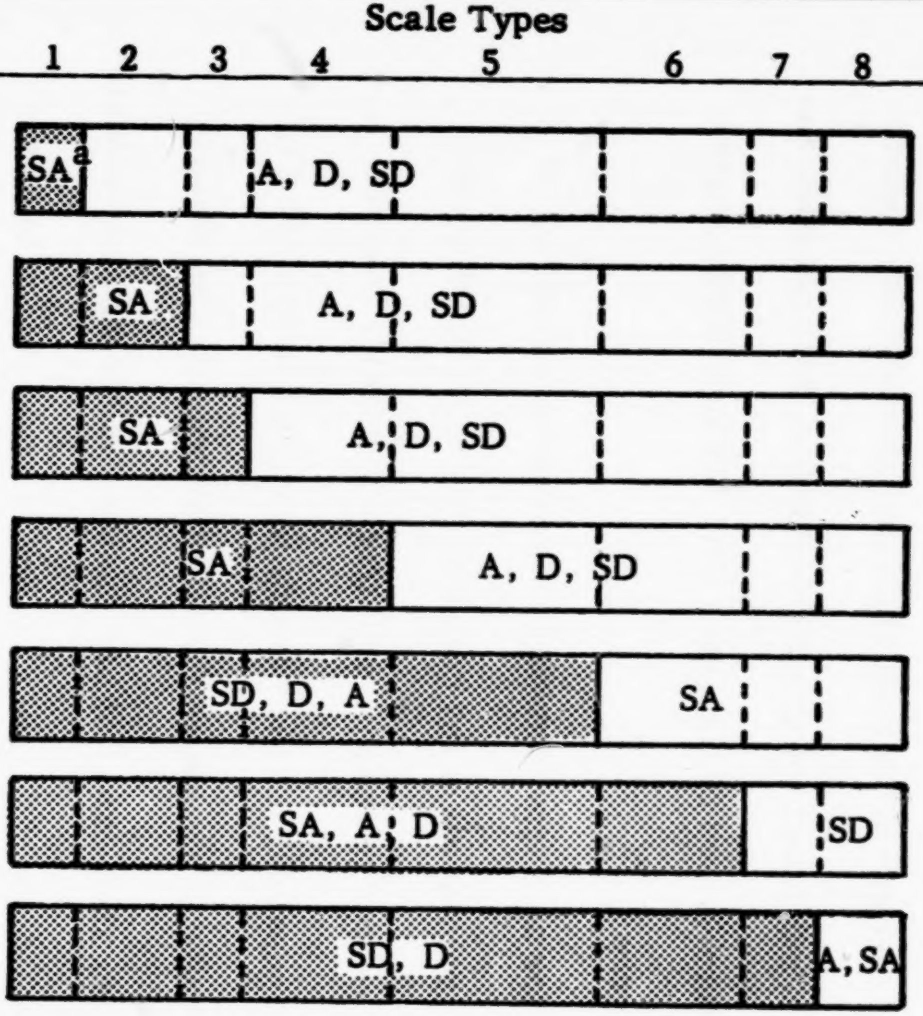
The Measurement of Pupil Morale

The four aspects of pupil morale were measured on a set of questions included in the fall and spring questionnaires. These questions were selected on the basis of experience gained in the pilot study and pretested for comprehensibility and validity in individual and group interviews. Each question was in the form of a statement followed by the check list: strongly agree, agree, disagree, strongly disagree.

Pupil responses for each type of morale were treated according to Guttman Scaling procedures and all of the resulting scales had coefficients of reproducibility of at least 88 percent.[8] Fall teacher morale, however, was based on one single question, for the reasons discussed in Chapter III.

In Figures II-1 and II-2 are shown the seven statements that make up the school morale scales. Only one statement included in the fall questionnaire failed to scale. This statement, "If I had a chance, I would change to another school," we learned during the fall administration expressed the pupil's attitude toward attending an elementary school rather than a junior high school. The cutting points on scale items were different in the spring than in the fall and reproducibility was a little poorer, 88 percent compared with 90 percent. Declining morale influenced certain statements in the scale more than others (See Table II-14). For these, cutting points between the strongly favorable response and all others in the fall had shifted by spring to a division between

Question		Errors
4.	I like school better than most pupils my age.	95
6.	I feel good about coming to school.	150
31.	After a vacation, I am happy to get back to school.	158
24.	I like school better this year than I did last year.	321
28.	I would like to drop school now.[b]	179
19.	I have a better time at school than I do at home.	291
16.	I like to miss school.[b]	200



Cumulative Percent: 8 18 25 41 65 80 100
Cumulative Frequency: 156 355 504 811 1291 1587 1975

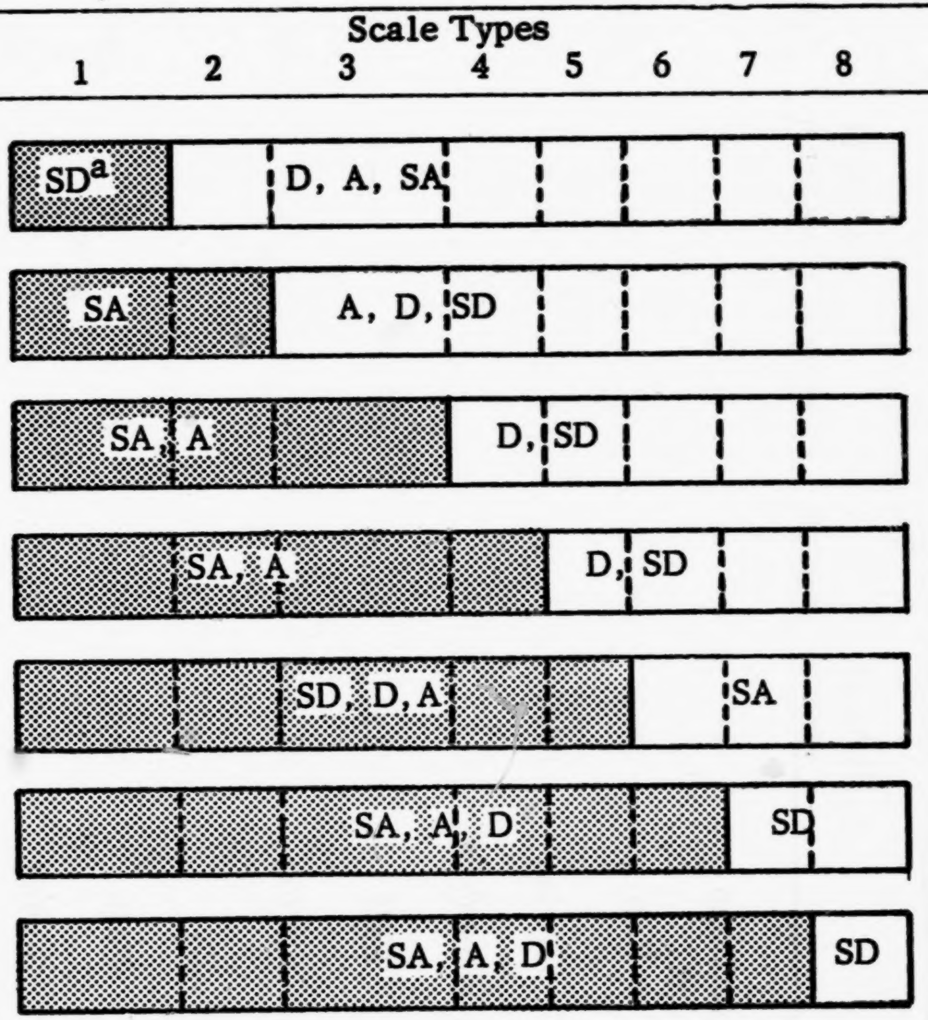
Coefficient of Reproducibility: 90.0

Fig II-1. FALL SCHOOL MORALE SCALE FOR THE 1975 BAY CITY PUPILS OF 74 TEACHERS, WITH SCALE ITEMS DICHOTOMIZED (Shaded areas represent cumulative frequencies and percentages of pupils for each scale type)

[a] SA: Strongly Agree A: Agree D: Disagree SD: Strongly Disagree

[b] Reflected

Question		Errors
16.	I like to miss school.[b]	247
24.	I like school better this year than I did last year.	303
4.	I like school better than most pupils my age.	203
6.	I feel good about coming to school.	171
28.	I would like to drop school now.[b]	376
19.	I have a better time at school than I do at home.	317
31.	After a vacation, I am happy to get back to school.	143



	1	2	3	4	5	6	7	8
Cumulative Percent:	18	29	49	60	69	80	88	100
Cumulative Frequency:	372	603	1039	1272	1468	1695	1874	2120

Coefficient of Reproducibility: 88.0

Fig II-2. SPRING SCHOOL MORALE SCALE FOR THE 2120 BAY CITY PUPILS OF 74 TEACHERS, WITH SCALE ITEMS DICHOTOMIZED (Shaded areas represent cumulative frequencies and percentages of pupils for each scale type)

[a] SA: Strongly Agree A: Agree D: Disagree SD: Strongly Disagree

[b] Reflected

Table II-14. QUESTIONS INCLUDED IN THE SCALES MEASURING FALL AND SPRING SCHOOL MORALE OF 2, 120 BAY CITY PUPILS WITH PERCENTAGE REPLIES

Question		Response (Percent)				
		Strongly Agree	Agree	Disagree	Strongly Disagree	Total
4. I like school better than most pupils my age.	Fall	12.2	35.0	40.6	12.2	100.0
	Spring	14.3	37.1	35.7	12.9	100.0
6. I feel good about coming to school.	Fall	24.3	61.1	16.3	8.3	100.0
	Spring	17.4	44.1	23.5	15.0	100.0
16. I like to miss school. (Reflected)	Fall	9.0	13.1	38.3	39.6	100.0
	Spring	12.3	18.7	39.6	29.4	100.0
19. I have a better time at school than I do at home.	Fall	10.6	18.8	40.8	29.8	100.0
	Spring	10.4	19.9	38.2	31.5	100.0
24. I like school better this year than I did last year.	Fall	37.1	28.3	18.9	15.7	100.0
	Spring	32.8	28.3	20.1	18.8	100.0
28. I would like to drop school now. (Reflected)	Fall	5.6	3.1	24.1	67.3	100.0
	Spring	6.0	4.7	24.3	65.0	100.0
31. After a vacation, I am happy to get back to school.	Fall	27.2	39.2	20.0	13.7	100.0
	Spring	19.3	36.1	26.1	18.5	100.0

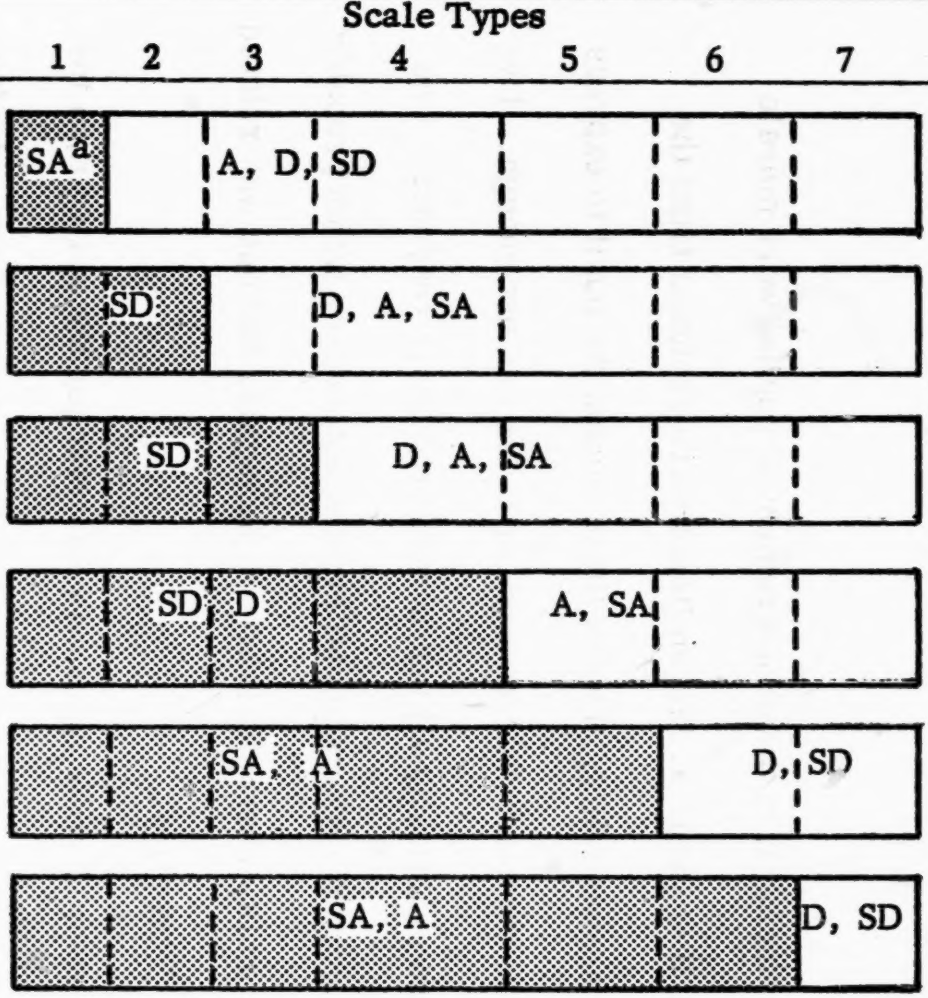
favorable and unfavorable, or even between strongly unfavorable and all others. The resulting change in the content of scale types over the year made direct comparison of scale scores for fall and spring of uncertain value.

The six items included in the measurement of pupils' work morale are shown in Figures II-3 and II-4. Seven items were excluded from the fall set because of non-scalability. Two of these caused the pupil to express dissatisfaction because the work was too easy or there was not enough. Two were excluded because practically all pupils made the same response. One item concerned saving work such as social studies notebooks, which probably measured other personality characteristics of the pupils, and one was related to non-subject matter activities.

Again, the content of scale types was different for the spring than for the fall, and again the cutting points reflect a decline in work morale during the year. The coefficients of reproducibility for both fall and spring work morale scales were 89 percent.

Peer morale was measured on the basis of the five items shown in Figures II-5 and II-6. Three items were excluded from this scale on the basis of non-scalability. While the items retained all had to do with liking and being liked by other class members, the excluded questions dealt with slightly different aspects of peer relations. Peer relationships were perceived as poorer in spring than fall, but no more pupils reported that peer relationships made them feel unhappy. (Table II-16) Coefficients of reproducibility for fall and spring were 90 and 92 percent, respectively.

Question		Errors
1.	I like to do my school work for this class.	165
21.	Time in this class passes very slowly for me. I'm what you call a "Clock-watcher".[b]	225
10.	My school work makes me feel nervous.[b]	243
25.	I dislike having to finish my school work instead of going to a movie or playing with my friends.[b]	248
14.	After a vacation, I want to get back to school in order to learn something.	181
20.	I am making good progress in my school work for this class.	252



	1	2	3	4	5	6	7
Cumulative Percent:	12	23	34	55	72	87	100
Cumulative Frequency:	233	462	675	1091	1423	1720	1975

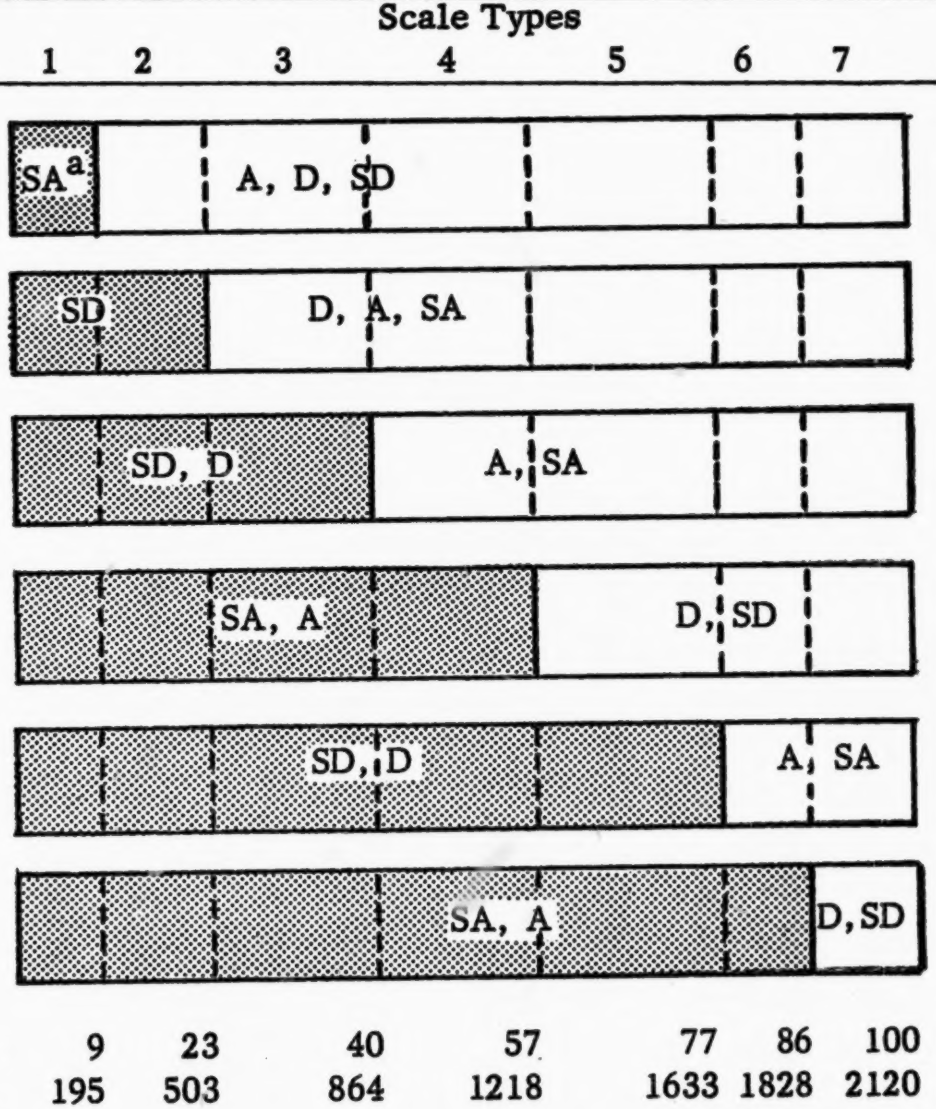
Coefficient of Reproducibility: 88.9

Fig. II-3. FALL PUPIL WORK MORALE SCALE FOR THE 1975 BAY CITY PUPILS OF 74 TEACHERS, WITH SCALE ITEMS DICHOTOMIZED (Shaded areas represent cumulative frequencies and percentages of pupils for each scale type)

[a] SA: Strongly Agree A: Agree D: Disagree SD: Strongly Disagree

[b] Reflected

Question		Errors
20.	I am making good progress in my school work for this class.	161
10.	My school work makes me feel nervous.[b]	270
25.	I dislike having to finish my school work instead of going to a movie, or playing with my friends.[b]	290
14.	After a vacation, I want to get back to school in order to learn something.	262
21.	Time in this class passes very slowly for me. I'm what you call a "Clock-watcher".[b]	248
1.	I like to do my school work for this class.	191



Coefficient of Reproducibility: 88.7

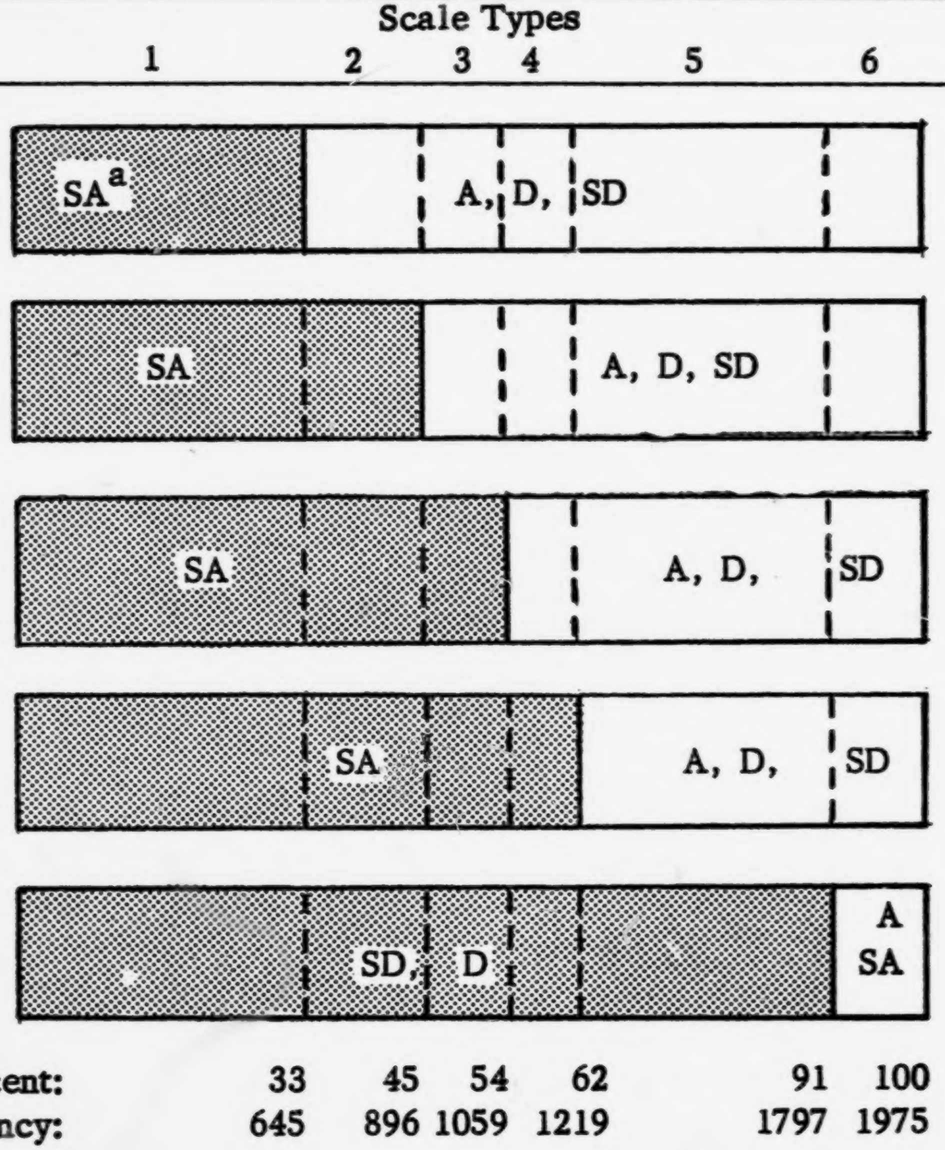
Fig. II-4. SPRING WORK MORALE SCALE FOR THE 2120 BAY CITY PUPILS OF 74 TEACHERS, WITH SCALE ITEMS DICHOTOMIZED (Shaded areas represent cumulative frequencies and percentages of pupils for each scale type)

[a] SA: Strongly Agree A: Agree D: Disagree SD: Strongly Disagree

[b] Reflected

Table II-15. QUESTIONS INCLUDED IN THE SCALES MEASURING FALL AND SPRING WORK MORALE OF 2,120 BAY CITY PUPILS, WITH PERCENTAGE REPLIES

Question		Response (Percent)				
		Strongly Agree	Agree	Disagree	Strongly Disagree	Total
1. I like to do my school work for this class.	Fall	20.2	68.1	9.2	2.5	100.0
	Spring	14.6	62.5	17.6	5.3	100.0
10. My school work makes me feel nervous.	Fall	5.0	12.8	45.1	37.1	100.0
	Spring	7.1	15.2	43.8	33.9	100.0
14. After a vacation, I want to get back to school in order to learn something.	Fall	25.5	42.8	19.3	12.4	100.0
	Spring	14.3	38.9	26.2	20.6	100.0
20. I am making good progress in my school work for this class.	Fall	16.7	57.3	21.1	4.9	100.0
	Spring	16.8	58.8	19.3	5.1	100.0
21. Time in this class passes very slowly for me. I'm what you call a "clock watcher". (Reflected)	Fall	9.0	15.5	43.2	32.3	100.0
	Spring	10.2	15.7	43.7	30.4	100.0
25. I dislike having to finish my school work instead of going to a movie or playing with my friends. (Reflected)	Fall	16.4	29.3	35.1	19.2	100.0
	Spring	2.12	35.7	27.9	15.2	100.0



Question		Errors
34.	Members of this class are friendly to me.	155
30.	I enjoy working with members of my class	275
2.	I have many friends in this class.	270
8.	I enjoy being with members of this class.	103
23.	I feel unhappy about the way I get along with the members of my class.[b]	139

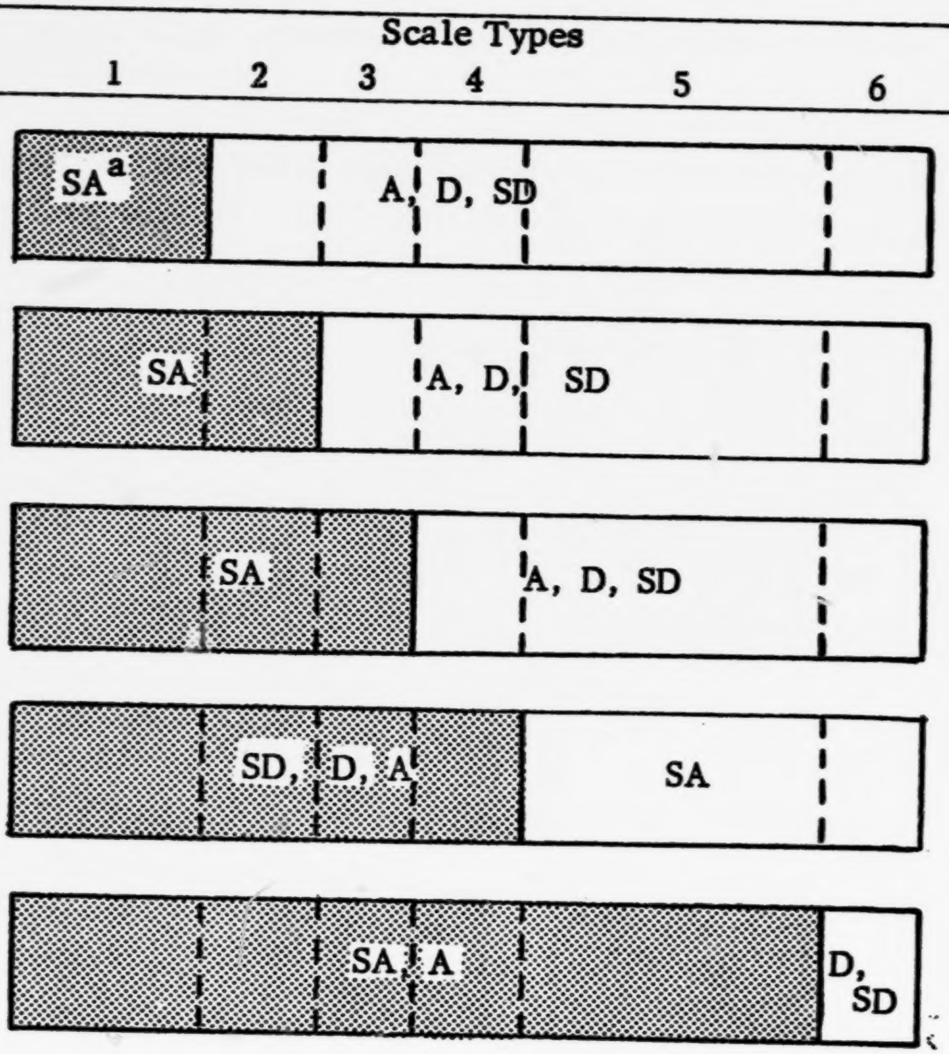
Coefficient of Reproducibility: 90.4

Fig. II-5. FALL PEER MORALE SCALE FOR THE 1975 BAY CITY PUPILS OF 74 TEACHERS, WITH SCALE ITEMS DICHOTOMIZED (Shaded areas represent cumulative frequencies and percentages of pupils for each scale type)

[a] SA: Strongly Agree A: Agree D: Disagree SD: Strongly Disagree

[b] Reflected

Question		Errors
34.	Members of this class are friendly to me.	185
30.	I enjoy working with members of my class.	191
8.	I enjoy being with members of this class.	167
23.	I feel unhappy about the way I get along with the members of my class.[b]	257
2.	I have many friends in this class.	25



Cumulative Percent: 22 34 44 57 91 100
Cumulative Frequency: 469 725 931 1215 1941 2120

Coefficient of Reproducibility: 92.2

Fig. II-6. SPRING PEER MORALE SCALE FOR THE 2120 BAY CITY PUPILS OF 74 TEACHERS, WITH SCALE ITEMS DICHOTOMIZED (Shaded areas represent cumulative frequencies and percentages of pupils for each scale type)

[a] SA: Strongly Agree A: Agree D: Disagree SD: Strongly Disagree

[b] Reflected

Table II-16. QUESTIONS INCLUDED IN THE SCALES MEASURING FALL AND SPRING PEER MORALE OF 2,120 BAY CITY PUPILS, WITH PERCENTAGE REPLIES

Questions		Response (Percent)				
		Strongly Agree	Agree	Disagree	Strongly Disagree	Total
2. I have many friends in this class.	Fall	50.5	43.8	4.1	1.6	100.0
	Spring	40.7	49.7	7.4	2.2	100.0
8. I enjoy being with members of this class.	Fall	56.6	39.0	3.4	1.0	100.0
	Spring	44.2	46.8	6.5	2.5	100.0
23. I feel unhappy about the way I get along with the members of my class.	Fall	5.5	9.5	40.5	44.5	100.0
	Spring	5.7	9.7	37.7	46.9	100.0
30. I enjoy working with members of my class.	Fall	47.6	47.0	3.7	1.7	100.0
	Spring	37.8	53.4	6.0	2.8	100.0
34. Members of this class are friendly to me.	Fall	41.7	50.2	5.2	2.9	100.0
	Spring	31.1	58.5	7.3	3.1	100.0

The statement on which fall teacher morale was based was "I like my teacher." (See Table II-17)

In Figure II-7, are shown the eight spring teacher morale scale questions. All of the items selected to be included in this scale were found to be scalable, and the scales' coefficient of reproducibility was 95 percent. A decline in satisfaction with the teacher over the year is indicated by the fact that in the spring, one-fourth of the pupils disagreed or strongly disagreed with the statement, "I like my teacher", as compared to one-eighth in fall.

To obtain teacher scores on a morale measure, the distribution of morale scores for the pupils of each teacher was compared with the distribution of scores for the entire group of pupils for which the scale was constructed. The Kolmogorov-Smirnov statistic[9], which is the difference between the two cumulative frequency distributions at the point of maximum difference, was used as the teacher's morale score. This statistic was selected since it is the one most sensitive to the entire range of the distribution. The fall teacher morale score was the Kolmogorov-Smirnov statistic obtained by comparing the frequency distributions on the one question. Morale scores are reported so that positive scores indicate that a teacher's class had higher morale than the total group while negative scores indicate lower morale.

Teacher morale scores were not adjusted for differences in pupil characteristics because pupil scores on these variables were measured on an ordinal scale and could not be subjected to regression analysis.

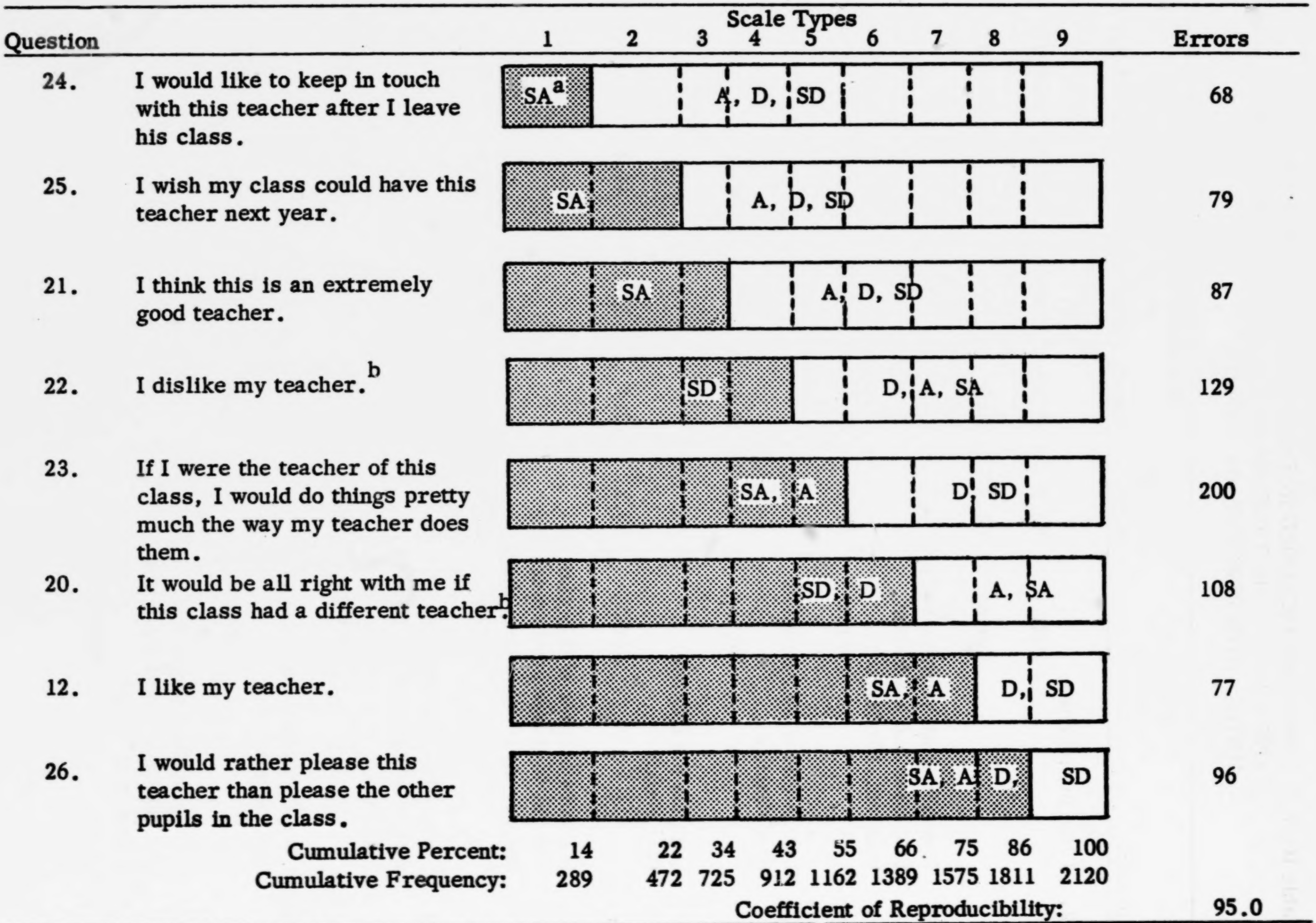


Fig. II-7. SPRING TEACHER MORALE SCALE FOR THE 2120 BAY CITY PUPILS OF 74 TEACHERS, WITH SCALE ITEMS DICHOTOMIZED (Shaded areas represent cumulative frequencies and percentages of pupils for each scale type)

a SA: Strongly Agree A: Agree D: Disagree SD: Strongly Disagree

b Reflected

Table II-17. QUESTIONS INCLUDED IN THE SCALES MEASURING FALL AND SPRING PUPIL TEACHER MORALE OF 2,120 BAY CITY PUPILS, WITH PERCENTAGE REPLIES

Question		Response (Percent)				
		Strongly Agree	Agree	Disagree	Strongly Disagree	Total
12. I like my teacher.	Fall	53.0	33.8	6.8	6.4	100.0
	Spring	38.4	34.5	11.4	15.7	100.0
20. It would be all right with me if this class had a different teacher. (Reflected)	Spring	19.5	15.5	27.1	37.9	100.0
21. I think this is an extremely good teacher.	Spring	36.1	28.9	19.8	15.2	100.0
22. I dislike my teacher. (Reflected)	Spring	10.2	13.4	30.0	46.4	100.0
23. If I were teacher of this class, I would do things pretty much the way my teacher does them.	Spring	21.9	31.1	26.7	20.3	100.0
24. I would like to keep in touch with this teacher after I leave his class.	Spring	16.9	34.3	26.7	22.1	100.0
25. I wish my class could have this teacher next year.	Spring	23.6	21.9	28.0	26.5	100.0
26. I would rather please this teacher than please the other pupils in the class.	Spring	15.7	32.5	32.4	19.4	100.0

The general class morale scale score for teachers was an index obtained by applying Guttman scaling techniques to the four morale scores. Since the Kolmogorov-Smirnov statistic may take any value from -100 to 100, this represented a rather unorthodox scaling procedure. The Cornell manual scaling technique was employed: that is, an initial order was established by summing the four scale scores, and cutting points that dichotomized each set of scale scores in such a way as to minimize scale error were established by inspection. The resulting scales are shown for fall and spring general class morale in Tables II-18 and II-19, respectively.

The teachers' scores on general class morale are also indicated in these tables. To obtain these scores, the mean of all scores above the cutting point and the mean of all scores below the cutting point for each of the four individual scales were computed. A teacher's score was the sum of the mean values represented by the pattern for the scale type in which the teacher was classified, this sum being corrected to eliminate negative scores.

The coefficients of reproducibility for fall and spring general class morale scales were .92 and .95 respectively. The coefficients of item scalability were .77 and .84. Tables II-18 and II-19 also indicate item reproducibilities and scalabilities.

The latter was computed according to the following formula:

$$IS = 1 - \frac{e_i}{N_{si}}$$

where e_i represents error for the ith scale item and N_{si} represents the

Table II-18. FALL GENERAL MORALE SCALE OF KOLMOGOROV-SMIRNOV VALUES OF THE FOUR SPECIFIC MORALE SCALES, CLASSES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	Teacher	Work	School	Teacher	Peer
1	115	76	32	33	49	15
	115	05	23	34	17	39
	115	23	22	13	36	34
	115	61	21	21	47	12
	115	22	13	26	51	08
	115	26	25	18	12	33
	115	72	27	27	08	24
	115	32	12	14	41	11
	115	09	12	13	22	26
	115	54	17	26	36	-09
	115	65	11	27	16	15
	115	24	30	25	(-11)	17
	115	69	13	17	32	-09
	115	35	26	20	(-18)	24
	115	40	32	15	10	-06
	115	59	15	31	(-06)	06
	115	78	13	21	(-03)	14
	115	13	11	11	10	08
	115	39	20	12	(-10)	11
	115	79	16	09	10	-05
	115	14	28	20	(-13)	-05
2	92	01	03	20	11	20
	92	75	10	14	33	-06
	92	42	08	11	12	17
	92	71	-09	11	23	17
	92	57	-10	07	31	10
	92	53	10	16	(-17)	22
	92	04	07	17	18	-13
	92	63	-22	14	18	10
	92	47	05	13	(-15)	09
	92	66	-11	12	(-07)	15
	92	45	-09	12	(-15)	18
	92	06	-07	12	18	(-21)
	92	11	10	08	(-12)	-05
	92	44	-11	08	12	-14
	92	52	-16	05	(-23)	22
	92	62	-12	08	04	(-18)
	92	12	-13	10	(-03)	-14

Table II-18. FALL GENERAL MORALE SCALE OF KOLMOGOROV-SMIRNOV VALUES OF THE FOUR SPECIFIC MORALE SCALES, CLASSES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	Teacher	Work	School	Teacher	Peer
3	57	15	(19)	-19	25	30
	57	55	-05	-05	06	10
	57	77	-08	-10	27	-11
	57	41	-16	-20	07	18
	57	48	-18	-11	21	-15
	57	74	-11	-12	08	-13
4	28	51	(16)	-08	-15	13
	28	43	07	-13	-12	16
	28	50	(20)	-13	-06	-07
	28	73	(12)	-23	-10	09
	28	27	-16	-15	-09	24
	28	60	-19	(11)	-10	-10
	28	19	-05	-12	-34	14
	28	28	-10	-08	-14	-07
	28	33	07	-15	-24	-15
	28	07	-13	-12	-09	-15
	28	03	-20	-09	-18	-13
	28	80	08	-24	-32	-12
	28	08	-20	-25	-03	-13
	28	17	-06	-23	-25	-07
	28	64	-15	-14	-22	-10
	28	10	-09	-19	-21	-15
	28	20	-15	-26	-20	-09
5	1	70	(12)	-08	-02	-23
	1	58	(14)	-12	-11	-31
	1	37	(13)	-11	-25	-23
	1	29	-16	-09	-10	-17
	1	31	-12	-11	-13	-22
	1	56	-11	-17	-10	-21
	1	49	-07	-14	-19	-21
	1	81	-25	-34	(03)	-21
	1	25	-21	-15	-30	-25
	1	67	-30	-21	-31	(-15)
	1	36	-26	-23	-31	-23
	1	30	-36	-29	-24	-17
	1	21	-24	-22	-35	-26
Errors			7	1	14	3
Cutting Points			11/10	0/-1	0/-1	-15/-16
Item Reproducibility			.91	.97	.81	.96
Item Scalability			.75	.97	.67	.79

Scale Coefficient of Reproducibility: 92%

Coefficient of Item Scalability: 77%

Table II-19. SPRING GENERAL MORALE SCALE OF KOLMOGOROV-SMIRNOV VALUES OF THE FOUR SPECIFIC MORALE SCALES, CLASSES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	Teacher	Work	School	Teacher	Peer
1	121	01	23	24	35	32
	121	57	20	27	51	09
	121	59	22	25	20	18
	121	76	26	13	30	16
	121	54	24	18	46	-07
	121	75	21	13	19	23
	121	72	18	21	22	10
	121	22	11	24	44	-12
	121	35	11	15	10	28
	121	39	16	23	-09	16
	121	24	17	24	(-19)	24
	121	04	12	14	33	-14
	121	23	21	17	-11	18
	121	65	17	13	-06	18
	121	49	22	14	20	-15
	121	03	24	14	05	(-18)
2	101	09	07	27	36	14
	101	26	-11	34	22	32
	101	44	10	12	20	11
	101	15	09	13	18	08
	101	40	10	19	09	09
	101	63	-08	(09)	22	18
	101	55	07	16	-10	24
	101	41	07	10	28	-09
	101	77	-10	26	49	(-29)
	101	79	07	16	20	-08
	101	32	10	14	20	-11
	101	73	10	(09)	-06	16
	101	48	-14	17	32	-08
	101	07	-08	17	19	-08
	101	71	-16	12	30	-10
	101	58	10	15	09	(-28)
	101	53	-23	20	(-20)	24
	101	14	(19)	12	(-26)	-06
3	69	13	(14)	06	26	15
	69	28	10	-04	14	11
	69	33	10	-13	13	15
	69	62	(21)	-08	14	-15
	69	61	-07	07	16	-09
	69	70	-15	09	23	(-20)

Table II-19. SPRING GENERAL MORALE SCALE OF KOLMOGOROV-SMIRNOV VALUES OF THE FOUR SPECIFIC MORALE SCALES, CLASSES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	Teacher	Work	School	Teacher	Peer
	69	60	-09	-17	12	11
	69	43	-04	-06	14	-15
	69	06	-14	-14	22	-11
	69	74	-26	-14	22	-13
4	25	80	(24)	-08	-16	-11
	25	50	-14	07	-21	10
	25	11	-12	-12	-13	13
	25	56	-13	-12	-28	17
	25	78	(14)	-31	-12	-07
	25	51	-08	-10	-15	-06
	25	64	06	-17	-19	-10
	25	37	-12	-12	-16	-08
	25	42	-14	-14	-18	-03
	25	05	-18	-08	-16	-10
	25	25	-19	-13	-29	06
	25	10	-07	-20	-23	-07
	25	47	-12	-17	-42	12
	25	20	-17	-16	-32	05
	25	08	-09	-18	-22	-15
	25	66	-19	-31	-35	19
	25	29	-19	-25	-21	-13
	25	67	-22	-21	-50	11
	25	31	-11	-20	-39	-14
	25	52	-23	-35	-50	14
5	1	19	10	-10	-25	-17
	1	36	-31	-31	(21)	-33
	1	45	-14	-08	-39	-20
	1	81	-23	-26	-16	-17
	1	21	-22	-14	-32	(-15)
	1,	27	-15	-22	-37	-22
	1	30	-16	-13	-50	-23
	1	12	-33	-30	-31	-21
	1	17	-14	-32	-56	-24
Errors			5	2	4	5
Cutting Points			11/10	10/9	-11/-12	-15/-16
Item Reproducibility			.93	.97	.95	.93
Item Scalability			.76	.94	.87	.58

Scale Coefficient of Reproducibility: 95%

Coefficient of Item Scalability: 84%

number of teachers in the non-modal category created by the cutting point of the item.[10] The coefficient of item scalability is

$$S = 1 - \frac{\overset{i}{\sum} e_i}{\sum N_{si}}$$

The Measurement of Compliance

The compliance of pupils was measured in relation to both the requirements of task performance and classroom order under the assumption that the school system expects the teacher to obtain some measure of pupil compliance in both areas. One of the research questions was to determine the extent to which compliance in these areas was related to cognitive learning as well as other effect-variables.

Compliance with respect to task performance was measured in the following two ways: the extent to which pupils reported that they completed assignments and the extent to which they reported voluntary activities related to school subjects.

Compliance with Assigned Work

The principal previous effort to measure compliance with assigned work was that of Morris L. Cogan,[11] who administered a questionnaire to junior high school pupils, asking them how often they really did thirty different kinds of school work when they were assigned as homework. A slightly modified version of this questionnaire was employed in a pilot study for the study under discussion and was found unsatisfactory in two regards. First, it appeared that the pupils did not distinguish frequency of assignment and frequency of compliance in responding to the questionnaire. (And even if the pupils did, Cogan's scoring procedure did not.) Second, since homework constitutes a relatively small proportion of assignments, compliance with class work seemed equally or more important.

The present measurement of compliance was based on questions included in the questionnaire administered in the fall and spring by group interview technique. The questions concerned both class and homework assignments. The kinds of assignments included in the questionnaire were those in which the pupil engaged in the manipulation of educational materials. The most passive and most unobservable act included in the list of assignments was reading. The activity most removed from the manipulation of materials was giving oral talks or book reports. These classroom activities did not constitute all the educational experiences to which the child may be exposed: listening to the teacher or watching a film, for example, were not included because of their passive nature; participating in class discussion was not included because of the low involvement with educational materials. Nor were tests included.

The 17 kinds of assignments on which scores were based and which were selected on the basis of extensive pretesting, were:

1. work arithmetic problems
2. read science books
3. write science reports
4. do science projects
5. read social studies textbooks
6. read other social studies books
7. write social studies reports or do other things for social studies notebook
8. read library books
9. write book reports
10. give oral book reports to the class
11. give other talks or reports
12. read aloud
13. write stories
14. study spelling words
15. do exercises on parts of speech, punctuation, writing correct sentences, etc.
16. work with SRA reading laboratory
17. do art work

The frequency of each of these assignments was the consensus arrived at through class discussion conducted by the interviewer. Interviewers were briefed on kinds of activities to be included within the various kinds of work and given rules for handling problems which the pretesting indicated would arise. The interviewers' guiding of the discussion thus helped to insure uniformity of interpretation of the questionnaire from class to class. The section of the questionnaire dealing with assignments was introduced by the following statement:

> "Below are some questions about school work often assigned 6th, 7th and 8th graders to be done either in class or at home. We are going to read these questions and decide together how often you have had each kind of work this year."

About each kind of work the question was asked: "How often have you had a time when this kind of work was assigned?" Each pupil marked his questionnaire with the response agreed upon by the class unless assignments to individual pupils were actually divergent. In multigrade classes, each grade decided on the correct response for its grade when assignments differed.

The wording of the question in terms of the "number of times" pupils had been asked to work on a particular piece of work weighted larger tasks more heavily than smaller tasks.

The choices of response to this question and the weight each response was assigned were:

Response	Weight
Practically every day	20
Several times a week	10
About once a week	4
About once or twice a month	1.5
A few times this year	0
NEVER ASSIGNED	0

This interview procedure clarified for the pupils what was meant by each kind of work and prepared them to distinguish between the frequency with which assignments were made and the frequency which they actually completed them. The latter information for each kind of work was elicited by the question, "How much of the time did you ACTUALLY do this kind of work when it was ASSIGNED?" Each pupil answered these questions for himself after a careful explanation by the interviewer.

The pupils were asked to choose one of the following responses, for which weights are indicated:

Response	Weight
Practically all the time	2.0
Some of the time	1.0
Hardly ever	0
NEVER ASSIGNED	

A compliance score for each pupil was computed employing the following expressi[illegible]

$$C_{ij} = \frac{\sum_{K=1}^{17} a_{jk} \, c_{jk}}{\sum_{K=1}^{17} a_{jk}}$$

where C_{ij} was the score of the ith pupil of the jth teacher on the kth assignment, and a_{jk} was the weight assigned the kth assignment for the jth teacher. The denominator of this expression is referred to later in the report as the teacher's assignment volume score. This expression had the effect of giving the child more credit for complying with frequent assignments than for infrequent assignments, but made the compliance score independent of the volume of the teacher's assignments. The possible range of compliance scores was from 0 to 20.

The fall compliance score for each pupil was computed on the basis of the first five weeks of school while the spring compliance score represented the whole year's work. A third variable, difference between spring and fall compliance scores was also computed for each pupil.

The pupils' scores on fall and spring compliance to assignments formed the J-shaped distribution described by previous investigators for other forms of compliance behavior with the highest compliance scores occurring most frequently. For reasons of expediency, regression analysis which minimized the mean squares of the deviations from the regression line was applied to these data. The zero-order correlations between pupil characteristics and the three compliance scores are shown in Tables II-20 and II-21.

Except for initial STEP scores, the same set of pupil characteristics was used in the regression analysis of both gain and compliance. A stepwise multiple regression analysis was undertaken for all pupils having both fall and spring compliance scores, (as well as data on all background factors), again analyzing seventh grade classes and multigrade classes separately. The restricted set of variables used to adjust compliance scores are shown in Tables II-22 through II-26. These sets of variables were established in the same way as they were established for gain scores, and adjusted teacher scores

Table II-20. ZERO-ORDER CORRELATIONS BETWEEN SCORES MEASURING COMPLIANCE WITH ASSIGNMENTS AND PUPIL CHARACTERISTIC VARIABLES, 784 BAY CITY PUPILS, SEVENTH GRADE CLASSES

Pupil Characteristic Variables	Fall Compliance Scores	Spring Compliance Scores	Spring-Fall Difference Scores
Sex[a]	.13	.14	.04
Age	-.05	-.07	-.04
Occupation of Head of Household	.03	.01	-.03
Number of Schools Attended	-.003	-.03	.02
Number of Cooperative Pupils	-.07	-.10	-.05
Number of Uncooperative Pupils	-.04	-.08	-.05
I.Q.	.12	.06	-.02

[a] Males coded 1; females 2.

Table II-21. ZERO-ORDER CORRELATIONS BETWEEN SCORES MEASURING COMPLIANCE WITH ASSIGNMENTS AND PUPIL CHARACTERISTIC VARIABLES, 954 BAY CITY PUPILS, MULTIGRADE CLASSES

Pupil Characteristic Variables	Fall Compliance Scores	Spring Compliance Scores	Spring-Fall Difference Scores
Sex[a]	.19	.17	.01
Age	.04	-.04	-.02
Grade	.08	-.00	-.01
Occupation of Head of Household	-.09	-.01	-.03
Number of Schools Attended	-.05	-.05	.02
Number of Cooperative Pupils	-.07	-.01	-.05
Number of Uncooperative Pupils	-.11	-.09	-.01
I.Q.	.14	.17	.08

[a] Males coded 1; females, 2.

Table II-22. REGRESSION OF FALL SCORES MEASURING PUPIL COMPLIANCE TO ASSIGNED WORK ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 784 BAY CITY PUPILS, SEVENTH GRADE CLASSES

$$(Y = 1.42782+0.07385X_{Sx}+0.00152X_{IQ}-0.00939X_{NCP})$$

Pupil Characteristic Variables	df	Mean Squares	F
Sex	1	1.01	13.35[a]
I.Q.	1	1.00	13.47[a]
Number of Cooperative Pupils	1	.33	4.43[b]
Deviation from Regression	780	.07	

Multiple Correlation Coefficient = .20

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[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-23. REGRESSION OF FALL SCORES MEASURING PUPIL COMPLIANCE TO ASSIGNED WORK ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 954 BAY CITY PUPILS, MULTIGRADE CLASSES

$$(Y = 1.13321 + 0.10758X_{Sx} + 0.00179X_{IQ} - 0.01587X_{NUP} + 0.03946X_{Gr} - 0.01468X_{FaO})$$

Pupil Characteristic Variables	df	Mean Squares	F
Sex	1	2.98	33.88[a]
I.Q.	1	1.69	19.56[a]
Number of Uncooperative Pupils	1	1.03	12.06[a]
Grade	1	.74	8.71[a]
Father's Occupation	1	.36	4.30[b]
Deviation from Regression	948	.08	

Multiple Correlation Coefficient = .28

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[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-24. REGRESSION OF SPRING SCORES MEASURING PUPIL COMPLIANCE TO ASSIGNED WORK ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 784 BAY CITY PUPILS, SEVENTH GRADE CLASSES

$(Y = 1.45247 + 0.08379X_{Sx} - 0.01359X_{NCP} + 0.00089X_{IQ})$

Pupil Characteristic Variables	df	Mean Squares	F
Sex	1	1.36	16.53[a]
Number of Cooperative Pupils	1	.66	8.03[a]
I.Q.	1	.36	4.37[b]
Deviation from Regression	780	.08	

Multiple Correlation Coefficient = .19

---

[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-25. REGRESSION OF SPRING PUPIL SCORES MEASURING COMPLIANCE TO ASSIGNED WORK ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 954 BAY CITY PUPILS, MULTIGRADE CLASSES

$(Y = 1.29213 + 0.10199X_{Sx} + 0.00219X_{IQ} - 0.01343X_{NUP})$

Pupil Characteristic Variables	df	Mean Squares	F
Sex	1	2.53	27.61^a
I.Q.	1	2.41	27.03^a
Number of Uncooperative Pupils	1	.81	9.14^a
Deviation from Regression	950	.09	

Multiple Correlation Coefficient = .25

---

[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-26. REGRESSION OF FALL-SPRING DIFFERENCE IN SCORES MEASURING COMPLIANCE TO ASSIGNED WORK ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 954 BAY CITY PUPILS, MULTIGRADE CLASSES

$$(Y = -0.29529+0.00216X_{IQ})$$

Pupil Characteristic Variables	df	Mean Squares	F
I.Q.	1	2.36	6.68^{a}
Deviation from Regression	952	.35	

Multiple Correlation Coefficient = .08

[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

were likewise computed in the same manner. None of the pupil background characteristics correlated significantly with spring-fall compliance difference for pupils in classes composed entirely of seventh graders. The adjusted scores used for these teachers were the residuals from the mean.

Volunteer Work

In addition to measuring the extent to which pupils complied with assignments, the extent to which pupils engaged in activities related to subject matter but not required by the teacher was also investigated. This information was collected in the fall and spring group-administered questionnaire. Cogan's questionnaire also dealt with volunteer work, but we extensively modified his schedule for our use. The nine types of work included in our volunteer work score were selected after extensive pretesting.

The questions dealing with volunteer work were prefaced by the following instructions:

> The questions below are about EXTRA things you might do because your classwork made you interested in them, NOT because the teacher assigned them to you. Check the space beside the answer which best describes how often you have done each kind of extra work during this school year just because you wanted to.

Each question was of the following form:

1. I READ EXTRA BOOKS

_______1. practically every day
_______2. several times a week
_______3. about once a week
_______4. about once or twice a month
_______5. a few times this year
_______6. never

The remaining questions were:

2. I volunteered to answer in class
3. I did extra things to help this teacher
4. I did extra problems or examples
5. I did extra drawings, cartoons
6. I wrote extra poems, stories, or reports
7. I listened to extra radio or TV programs related to work in this class
8. I brought extra things to class
9. I read extra magazines or newspapers because of my work in this class

Responses were given the same weight as responses to assigned work questions. The equation for computing the volunteer work score for a pupil was,

$$V_i = \frac{\sum_{m=1}^{9} V_{im}}{9}$$

where the V_{im} is the weight received by the ith child on the mth question.

While the frequency distribution of pupil scores on compliance with assignments was j-shaped, compliance as measured by voluntarily undertaken activities was skewed in the opposite direction, the median scores being very low.

These scores were subjected to the same kind of stepwise multiple regression analysis described for compliance with assignments. And the identical set of tables are presented in II-27 through II-34. Again, mean teacher scores were adjusted on the basis of the restricted set of variables.

Table II-27. ZERO-ORDER CORRELATIONS BETWEEN VOLUNTEER WORK SCORES AND PUPIL CHARACTERISTIC VARIABLES, 784 BAY CITY PUPILS, SEVENTH GRADE CLASSES

Pupil Characteristic Variables	Fall Volunteer Work Score	Spring Volunteer Work Score	Spring-Fall Difference Score
Sex[a]	-0.02	-0.10	0.03
Age	0.04	-0.03	0.03
Occupation of Head of Household	0.00	0.03	0.02
Number of Schools Attended	-0.03	-0.02	0.004
Number of Cooperative Pupils[b]	0.08	-0.01	-0.07
Number of Uncooperative Pupils[b]	-0.12	-0.10	-0.06
I.Q.	0.05	0.04	-0.0002

[a] Males coded 1; females 2

[b] These observations were subjected to correlational analysis though they were not independent for pupils in the same class.

Table II-28. ZERO-ORDER CORRELATIONS BETWEEN VOLUNTEER WORK SCORES AND PUPIL CHARACTERISTIC VARIABLES, 954 BAY CITY PUPILS, MULTIGRADE CLASSES

Pupil Characteristic Variables	Fall Volunteer Work Score	Spring Volunteer Work Score	Spring-Fall Difference Score
Sex[a]	-0.04	-0.14	-0.03
Age	-0.02	0.00	0.03
Grade	-0.06	0.04	0.07
Occupation of Head of Household	-0.04	-0.01	-0.01
Number of Schools Attended	-0.01	0.02	0.03
Number of Cooperative Pupils[b]	0.02	0.02	0.03
Number of Uncooperative Pupils[b]	-0.03	0.05	0.08
I.Q.	0.07	0.06	-0.03

[a] Males coded 1; females 2

[b] These observations were subjected to correlational analysis though they were not independent for pupils in the same class.

Table II-29. REGRESSION OF FALL PUPIL VOLUNTEER WORK SCORES ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 784 BAY CITY PUPILS, SEVENTH GRADE CLASSES

$$(Y = +4.95213 - 0.22074X_{NUP} + 0.15773X_{NCP})$$

Pupil Characteristic Variables	df	Mean Squares	F
Number of Uncooperative Pupils	1	126.39	10.97[a]
Number of Cooperative Pupils	1	90.08	7.89[a]
Deviation from Regression	781	11.42	

Multiple Correlation Coefficient = .15

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[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-30. REGRESSION OF FALL PUPIL VOLUNTEER WORK ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 954 BAY CITY PUPILS, MULTIGRADE CLASSES

$$(Y = 5.43636 + 0.00973X_{IQ} - 0.26211X_{Gr})$$

Pupil Characteristic Variables	df	Mean Squares	F
I.Q.	1	49.80	4.59[b]
Grade	1	32.94	3.04
Deviation from Regression	951	10.83	

Multiple Correlation Coefficient = .09

---

[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-31. REGRESSION OF SPRING PUPIL VOLUNTEER WORK SCORES ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 784 BAY CITY PUPILS, SEVENTH GRADE CLASSES

$$(Y = +4.64739 - 059076X_{Sx} - 0.13796X_{NUP})$$

Pupil Characteristic Variables	df	Mean Squares	F
Number of Uncooperative Pupils	1	64.80	8.08[a]
Sex	1	65.23	8.06[a]
Deviation from Regression	781	8.02	

Multiple Correlation Coefficient = .14

---

[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-32. REGRESSION OF SPRING PUPIL VOLUNTEER WORK SCORES ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 954 BAY CITY PUPILS, MULTIGRADE CLASSES

$$(Y = +4.15351 - 0.73134X_{Sx})$$

Pupil Characteristic Variables	df	Mean Squares	F
Sex	1	128.10	19.05[a]
Deviation from Regression	952	6.73	
Multiple Correlation Coefficient = .14			

[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-33. REGRESSION OF FALL-SPRING DIFFERENCE IN VOLUNTEER WORK SCORES ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 784 BAY CITY PUPILS, SEVENTH GRADE CLASSES

$$(Y = -1.11718 - 0.19566X_{NCP})$$

Pupil Characteristic Variables	df	Mean Squares	F
Number of Cooperative Pupils	1	142.76	3.89[b]
Deviation from Regression	782	36.69	

Multiple Correlation Coefficient = .07

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[a] $P(F_{1,1000} \geq 6.66) = .01$

[b] $P(F_{1,1000} \geq 3.85) = .05$

Table II-34. REGRESSION OF FALL-SPRING DIFFERENCE IN VOLUNTEER WORK SCORES ON RESTRICTED SET OF PUPIL CHARACTERISTIC VARIABLES, 954 BAY CITY PUPILS, MULTIGRADE CLASSES

$$(Y = -4.83293+0.14790X_{NUP} +0.38035X_{Gr})$$

Pupil Characteristic Variables	df	Mean Squares	F
Number of Uncooperative Pupils	1	117.51	6.10[b]
Grade	1	68.54	3.57
Deviation from Regression	951	19.21	

Multiple Correlation Coefficient = .10

[a] $P(F_{1,1000} - 6.66) = .01$

[b] $P(F_{1,1000} - 3.85) = .05$

Classroom Order

That aspect of pupil compliance related to classroom order was measured only in spring, again, to reduce the possibility that the administration of the questionnaire would affect the teacher's behavior during the observation period. The three questions on which the index of classroom order was based were the following:

34. HOW OFTEN IS THIS CLASS INTERRUPTED BY POOR CONDUCT OR LACK OF COOPERATION ON THE PART OF PUPILS?

    Never.
    Occasionally.
    Often.
    Almost constantly.

10. MY CONDUCT IN THIS CLASS THIS YEAR HAS BEEN:

    Probably better than in past years.
    About the same as past years.
    Probably poorer than in past years.

11. HOW WOULD YOU DESCRIBE THE CONDUCT OF THIS CLASS AS A WHOLE?

    Better than other classes I've been in.
    About the same as other classes I've been in.
    Poorer than other classes I've been in.

These scores were treated in the manner described for the general class morale scale scores. A Kolmogorov-Smirnov value based on the index was obtained for each teacher's class as compared to the total group of pupils. This score was the teacher's classroom order score, again unadjusted because pupil scores could not be treated as measures on an interval scale. The coefficient of reproducibility for this index was 99 percent. The index is shown in Table II-35.

Table II-35. AN INDEX OF GENERAL CLASS ORDER, CLASSES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	Teacher	Question Numbers		
			11	10	34
1	109	57	42	29	71
	109	06	59	16	32
	109	31	59	11	11
	109	79	32	21	27
	109	43	18	(-07)	68
	109	75	29	17	27
	109	09	23	19	29
	109	54	22	20	28
	109	23	22	14	34
	109	70	39	15	13
	109	37	16	16	31
	109	51	24	03	30
	109	26	16	13	22
	109	05	22	09	19
	109	53	22	15	12
	109	69	16	38	-05
	109	72	18	11	-18
2	74	58	12	19	25
	74	42	11	[illegible]	27
	74	04	04	18	27
	74	77	09	02	37
	74	32	13	08	22
	74	76	-07	21	23
	74	63	15	10	12
	74	80	11	03	10
	74	61	03	12	03
	74	71	-19	06	23
	74	41	11	15	-16
	74	48	10	17	-18
	74	50	(23)	09	(-25)
	74	30	-07	02	12
	74	59	07	09	-10
	74	15	10	13	(-26)
	74	10	-25	10	10
	74	25	-18	05	04
	74	13	-03	03	-19
	74	40	-20	16	-17
3	48	29	11	-06	37
	48	66	12	-21	34

3

Table II-35. AN INDEX OF GENERAL CLASS ORDER, CLASSES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	Teacher	Question Numbers		
			11	10	34
	48	08	-16	-06	41
	48	62	-12	-05	35
	48	28	15	-05	05
	48	52	09	-12	11
	48	36	09	-21	19
	48	73	-12	-09	17
	48	01	14	-05	-14
	48	64	09	-07	-09
	48	49	-23	-13	25
	48	81	13	-11	-15
	48	14	11	-09	-18
	48	22	-25	-05	11
	48	21	02	-08	-17
	48	65	-15	-02	-06
	48	55	-18	-19	-09
	48	24	-14	-08	-07
	48	56	02	-19	-14
	48	33	-20	-07	-07
	48	39	-11	-17	-07
	48	44	-15	-13	-15
	48	67	-15	-14	-17
	48	35	-30	-01	-18
	48	47	-16	-23	-11
	48	20	-26	-18	-16
4	1	74	-10	-12	-33
	1	78	-15	-13	-28
	1	03	-24	-11	-25
	1	60	-23	-13	-25
	1	27	-28	-19	-29
	1	19	-30	-17	-30
	1	12	-35	-08	-46
	1	17	-34	-15	-49
	1	07	-25	-19	-55
	1	11	-49	-32	-37
	1	45	-66	-24	-59
Errors			1	1	2
Cutting Points			16/15	0/-1	-19/-20
Item Reproducibility			.99	.99	.97
Item Scalability			.94	.97	.85

Scale Coefficient of Reproducibility: 98%

Coefficient of Item Scalability: 94%

FOOTNOTES

1. Division of Occupational Analysis, Occupational Classification and Industry Index (Vol. II, 2nd ed., Dictionary of Occupational Titles; Washington, D. C.: United States Printing Office, 1949).

2. Carl Weinberg, Family Background and the School Adaptation of Seventh Grade Pupils (unpublished Ed.D. dissertation, University of California, Los Angeles, 1962), pp. 68-69.

3. S. S. Wilks, Mathematical Statistics (Princeton, New Jersey: Princeton University Press, 1946), pp. 157-75.

4. Among the several sources of computer programs utilized in the data analysis in this research, the following organizations provided the programs most heavily used in the analysis (listed below along with their respective programs that were especially central to the analysis):

University of California, Los Angeles, School of Medicine, Department of Preventive Medicine and Public Health, Division of Biostatistics. This organization published the following programs in the Biomedical Computer Programs Manual (mimeographed, December 1, 1961):

Bimed 24	Data Screening No. 3
Bimed 34	Generalized Stepwise Regression
Bimed 40	Guttman Scaling No. 2
Bimed X13	Correlation Analysis No. 1

University of California, Los Angeles, Graduate School of Business Administration, Western Data Processing Center. This organization has published the following programs in The WDPC Users Manual (mimeographed, December, 1962):

QUAP-4	Questionnaire Analysis Program
WDCORR	Correlation Analysis Program

University of California, Los Angeles, Department of Sociology. This organization published the following programs in The Computer Program Library, Department of Sociology (mimeographed, 1963):

SOC 1	Descriptive Statistics for Interval Data
SOC 4	Rank Correlation and Descriptive Statistics
SOC 18	Non-Parametric Analyzer

University of California, Berkeley, Computer Center. This organization published the following program (mimeographed, 1961):

G4 BC GUTS Guttman Scaling

5. Statistical significance of reduction in residuals was measured by

$$F = \frac{(Q_H - Q)/t}{Q(n-p)}$$

where

Q = sum of squared residuals for total set

Q_H = sum of squared residuals for restricted model

n = number of observations

p = rank of the matrix of n observations on r variables

t = the differences between p and the rank of the matrix of n observations on the variables in the restricted model.

See Joe H. Ward, Jr., "Multiple Linear Regression Models," in Harold Borko, ed., Computer Applications in the Behavioral Sciences (Englewood Cliffs, New Jersey: Prentice-Hall, 1962), pp. 205-12.

6. Cooperative Test Division, Educational Testing Service (Princeton, New Jersey; Los Angeles 27, California, 1957).

7. Oscar Buros (ed.), Fifth Mental Measurements Yearbook (Highland Park, New Jersey: The Cyphon Press), pp. 62-75, in which a complete critical review of the STEP Tests may be found.

8. These Guttman scales were obtained through the use of both the Guttman scaling programs identified in a footnote above as G4 BC GUTS and Bimed 40.

9. This statistic was obtained through the use of the program identified in a footnote above as QUAP-4.

10. Herbert Menzel, "A New Coefficient for Scalogram Analysis," Public Opinion Quarterly, Vol. 17 (Summer, 1953), pp. 268-80.

11. Cogan, op. cit.

CHAPTER III

THE DIMENSION OF TEACHER LEADERSHIP

Teacher leadership has been conceived as a set of dimensions of behavior derived from the classroom social system, dimensions which at the same time are those defined by the larger social system of the school in the context of the community. The theoretical basis for treating the functions of teacher leadership as composed of the three dimensions of teacher behavior was discussed in Chapter I. This chapter will present the behavioral content of the three dimensions, the scales which were developed to measure the level of performance of each teacher on each of the three dimensions, the interrelationship of the dimensions, and the modes of teacher behavior. The latter are conceived as combinations of the three dimensions into a single style of leadership, which combinations define the levels of performance of the teacher's behavior on all three dimensions at once.

Measurement of the Dimension of Teacher Leadership

The concepts of task, authority, and expressive as dimensions of teacher behavior employed in this study were refinements of the leadership concepts developed in the pilot study discussed in Chapter I. Median pupil responses to questions used in the pilot study had been found to be scalable using Guttman scaling techniques. The content of the three scales measuring the task, authority, and expressive dimensions were presented in Chapter I. These scales were the basis for the formulations and measurement of the three leadership dimensions employed in the current study.

As in the pilot study, pupils' perception of teacher behavior was chosen as the most appropriate means of observation to avoid the disturbance of the teacher's normal classroom style by outside observers, for reasons of administrative efficiency in conducting the study, but primarily because it was assumed that the pupils' observation was the most valid for the interest of the study, to predict the effect of teacher behavior on pupils.

The questions representing the data from which leadership scales were constructed were included in the spring questionnaire. Each question with its set of possible replies was read to the pupils in the classroom groups; and pupils responded individually. The observations on teacher behavior were taken only in the spring to avoid the possibility of teachers' changing their behavior because of their knowledge about and sensitivity to the objectives of the study.

The pilot study scales contained six to seven items. Some of these were reformulated, some were eliminated to make scale content more consistent with theoretical concepts, and new items were added. This new set of questions was pretested for comprehensibility, consensus, and scalability on a sample of seventh grade pupils other than the Bay City study group. The questions from which the Guttman scales for the current study were constructed are shown in Tables III-1, III 2, and III-3 with the percentage of pupils' replies for the 2,120 pupils regarding the 74 Bay City teachers.

Class consensus on questions was relatively high on those questions where uniformity of response was expected. Nevertheless, some procedure was required to convert the frequency distribution of class responses into a

Table III-1. QUESTIONS INCLUDED IN THE SCALE MEASURING THE TASK DIMENSION OF THE TEACHER'S CLASSROOM BEHAVIOR, WITH PERCENTAGE REPLIES FOR THE 2, 120 BAY CITY PUPILS

Question Numbers	Questions	Response (percent)
18	ARE YOU GIVEN NEW WORK IN ARITHMETIC BEFORE YOU ARE ABLE TO GET THE RIGHT ANSWERS TO THE OLD WORK?	
	1. I am not given new kinds of arithmetic until I can do the old kind correctly.	55
	3. I am sometimes given new kinds of arithmetic before I can do the old kind.	37
	5. I am almost always given a new kind of arithmetic before I can do the old kind.	8
		100
21	DOES THE TEACHER SEE TO IT THAT YOU COMPLETE ALL OF THE WRITTEN ASSIGNMENTS OR NOT?	
	1. Makes sure we complete practically all written assignments.	59
	3. Sometimes makes sure we complete written assignments.	33
	5. Hardly ever makes sure we complete written assignments.	8
		100
6	DOES THIS TEACHER GO OVER A DAY'S WORK WITH YOU AGAIN BEFORE GOING ON TO THE NEXT LESSON, OR DO YOU GO ON WITHOUT REVIEWING?	
	1. Reviews every lesson (either at the end or the beginning.	13
	3. Reviews most lessons.	36
	4. Reviews some lessons but not regularly.	35
	5. Hardly ever reviews lessons.	16
		100

Table III-1. QUESTIONS INCLUDED IN THE SCALE MEASURING THE TASK DIMENSION OF THE TEACHER'S CLASSROOM BEHAVIOR, WITH PERCENTAGE REPLIES FOR THE 2,120 BAY CITY PUPILS

Question Numbers	Questions	Response (percent)
20	WHAT DOES THIS TEACHER MOST OFTEN DO WHEN HE IS TEACHING THE CLASS SOMETHING NEW AND THE PUPILS DON'T UNDERSTAND?	
	1. Tries to explain it again another way.	76
	3. Gives the same explanation over again.	17
	5. Moves on to something else even though we don't understand.	7
		100
14	HOW OFTEN ARE YOU REQUIRED TO SHOW THE TEACHER (BY WRITING OR TELLING THE ANSWER TO A QUESTION OR A PROBLEM) THAT YOU UNDERSTAND WHAT IS BEING TAUGHT?	
	1. Several times every day.	14
	2. Once every day.	9
	3. Almost every day.	22
	4. Several times a week.	42
	5. Never.	13
		100
17	WHEN YOU HAVE LEARNED A CERTAIN KIND OF ARITHMETIC, DO YOU USE IT OVER AGAIN DURING THE YEAR OR STOP USING IT AFTER YOU HAVE TAKEN UP A DIFFERENT KIND OF PROBLEM?	
	1. Keep using a kind of arithmetic over and over again.	18
	3. Keep using a kind of arithmetic sometimes after we have taken up a new kind.	67
	5. Hardly ever use an old kind of arithmetic after we take up a new kind.	15
		100

Table III-1. QUESTIONS INCLUDED IN THE SCALE MEASURING THE TASK DIMENSION OF THE TEACHER'S CLASSROOM BEHAVIOR, WITH PERCENTAGE REPLIES FOR THE 2,120 BAY CITY PUPILS

Question Numbers	Questions		Response
			(percent)
4(R)[a]	HOW ARE YOUR PAPERS USUALLY CORRECTED?		
	1.	I don't know, papers aren't returned.	2
	2.	A grade or comment for the whole paper is given but all mistakes are not marked.	9
	4.	All mistakes are marked.	52
	5.	All mistakes are marked and we are shown how the work is wrong.	37
			100

[a] Reflected

Table III-2. QUESTIONS INCLUDED IN THE SCALE MEASURING THE AUTHORITY DIMENSION OF THE TEACHER'S CLASSROOM BEHAVIOR, WITH PERCENTAGE REPLIES FOR THE 2,120 BAY CITY PUPILS

Question Numbers		Questions	Response (percent)
2		DO PUPILS HAVE TO GET PERMISSION TO LEAVE THEIR SEATS IN THIS CLASS OR NOT?	
	1.	We can never leave our seats without getting permission.	8
	2.	We can leave our seats without permission if we follow certain rules.	37
	5.	We can leave our seats without getting permission almost any time.	55
			100
28		HOW MUCH INSTRUCTION DOES THE TEACHER GIVE A SOCIAL STUDIES COMMITTEE?	
	1.	We never have social studies committees.	40
	2.	The teacher tells the committee exactly what to do and how to do it.	8
	4.	The teacher tells the committee what to do, but lets it decide how to do it.	33
	5.	The teacher leaves almost everything up to the committee.	19
			100
31		WHEN THE CLASS STARTS A NEW SOCIAL STUDIES UNIT, WHO PLANS HOW YOU WILL DO THE WORK?	
	1.	We do it the way the teacher plans it.	57
	2.	The teacher and the pupils plan it together.	23
	4.	The teacher expects the pupils to work out a plan, but he gives advice if we ask him.	17
	5.	The plan is entirely up to the pupils.	3
			100

Table III-2. QUESTIONS INCLUDED IN THE SCALE MEASURING THE AUTHORITY DIMENSION OF THE TEACHER'S CLASSROOM BEHAVIOR, WITH PERCENTAGE REPLIES FOR THE 2,120 BAY CITY PUPILS

Question Numbers	Questions	Response (percent)
23	WHEN THE TEACHER HAS MADE UP HIS MIND ABOUT SOMETHING, HAS HE EVER CHANGED IT WHEN THE PUPILS OBJECTED?	
	1. Hardly ever.	29
	2. A few times when the pupils had good reasons.	60
	4. Quite often, whether the pupils had good reasons or not.	8
	5. Practically every time anyone objected.	3
		100
10	WHAT DOES THE TEACHER DO WHEN HE AND THE PUPILS DISAGREE ABOUT SOME IDEA IN SOCIAL STUDIES?	
	1. Doesn't encourage pupils to express opinions.	4
	3. Lets pupils express their opinions but only sees his side.	23
	5. Lets pupils express their opinions and we look at both sides.	73
		100
22(R)[a]	WHEN THE TEACHER ASKS PUPILS TO DO SOMETHING THEY DO NOT WANT TO DO, DOES HE OR DOES HE NOT EXPLAIN WHY THEY HAVE TO DO IT?	
	1. He almost always explains why.	27
	3. He sometimes explains why.	40
	5. He hardly every explains why.	33
		100

[a] Reflected

Table III-2. QUESTIONS INCLUDED IN THE SCALE MEASURING THE AUTHORITY DIMENSION OF THE TEACHER'S CLASSROOM BEHAVIOR, WITH PERCENTAGE REPLIES FOR THE 2,120 BAY CITY PUPILS

Question Numbers	Questions	Response (percent)
29	HOW OFTEN WOULD YOU SAY THIS TEACHER HAS CHANGED ASSIGNMENTS THIS YEAR BECAUSE THE PUPILS OBJECTED TO THEM?	
	1. Hardly ever.	63
	2. A few times when the pupils had good reasons.	32
	4. Quite often, whether the pupils had good reasons or not.	4
	5. Practically every time anyone objected.	1
		100
24	AFTER YOU KNOW WHAT YOU ARE GOING TO DO IN THIS CLASS, WHO USUALLY DECIDES HOW YOU ARE GOING TO DO IT?	
	1. The teacher decides and tells us.	31
	2. The teacher listens to our ideas about it, but he decides.	20
	4. The teacher talks it over with us, and helps us decide.	41
	5. The teacher lets us decide.	8
		100
5	HOW MANY COMMITTEES HAVE YOU BEEN ON THIS YEAR IN THIS CLASS?	
	1. None	20
	2. One or two.	37
	3. Three.	15
	4. Four.	11
	5. Five or more.	17
		100

Table III-3. QUESTIONS INCLUDED IN THE SCALE MEASURING THE EXPRESSIVE DIMENSION OF THE TEACHER'S CLASSROOM BEHAVIOR, WITH PERCENTAGE REPLIES FOR THE 2, 120 BAY CITY PUPILS

Question Numbers	Questions	Response (percent)
19	DOES THIS TEACHER SHOW THAT HE WANTS TO MAKE THE WORK INTERESTING FOR THE PUPILS OR DOES HE NOT?	
	1. Almost always interesting.	37
	2. Sometimes interesting.	41
	4. Not very interesting.	13
	5. Practically never interesting.	9
		100
27	DOES THE TEACHER ASK YOU QUESTIONS IN A WAY WHICH MAKES YOU NERVOUS AND UNCOMFORTABLE ABOUT ANSWERING THEM, OR DOES HE ASK YOU QUESTIONS IN A KIND WAY?	
	1. Just about always kind.	24
	2. Often kind, but occasionally makes me uncomfortable.	44
	4. Often makes me feel nervous and uncomfortable, but not always.	23
	5. Just about always makes me nervous and uncomfortable.	9
		100
30	DOES THIS TEACHER SHOW THAT HE DISLIKES PUPILS IN THE CLASS OR NOT?	
	1. Shows dislike for none of the pupils.	36
	2. Shows dislike for a few pupils.	45
	3. Shows dislike for some pupils.	13
	4. Shows dislike for most pupils.	4
	5. Shows dislike for everyone in the class.	2
		100

Table III-3. QUESTIONS INCLUDED IN THE SCALE MEASURING THE EXPRESSIVE DIMENSION OF THE TEACHER'S CLASSROOM BEHAVIOR, WITH PERCENTAGE REPLIES FOR THE 2, 120 BAY CITY PUPILS

Question Numbers	Questions	Response (percent)
26	DOES THIS TEACHER TRY TO MAKE THE CLASS ENJOYABLE FOR THE PUPILS OR NOT?	
	1. Almost always tries to make the class enjoyable.	45
	3. Sometimes tries to make the class enjoyable.	40
	5. Practically never tries to make the class enjoyable.	15
		100
25	DOES THIS TEACHER SHOW THAT HE LIKES PUPILS IN THIS CLASS OR NOT?	
	1. Shows he likes all pupils.	34
	2. Shows he likes most pupils.	37
	3. Shows he likes some pupils.	15
	4. Shows he likes just a few pupils.	12
	5. Shows liking for none of the pupils.	2
		100
32	IS THIS TEACHER USUALLY FAIR OR USUALLY UNFAIR WHEN HE DECIDED THINGS ABOUT PUPILS?	
	1. He is always fair.	21
	2. He is usually fair.	37
	4. He is fair to most pupils; a few are treated better; a few are treated worse.	37
	5. He is unfair to most pupils.	5
		100
11(R)[a]	DOES THIS TEACHER HELP YOU WITH THE WORK OR LET YOU GET IT FOR YOURSELF?	
	1. I hardly get any help.	9
	3. I get some help but not as much as I need.	30
	5. I get all the help I need.	61
		100

[a] Reflected

Table III-3. QUESTIONS INCLUDED IN THE SCALE MEASURING THE EXPRESSIVE DIMENSION OF THE TEACHER'S CLASSROOM BEHAVIOR, WITH PERCENTAGE REPLIES FOR THE 2,120 BAY CITY PUPILS

Question Numbers	Questions		Response (percent)
12(R)[a]	DOES THE TEACHER MAKE SURE YOU LEARN THE FACTS OR IS HE MORE INTERESTED IN HOW PUPILS FEEL ABOUT THINGS?		
	1.	Shows little or no concern about the facts or how we feel.	5
	2.	Just makes sure we learn the facts.	20
	4.	Makes sure we learn the facts but is sometimes interested in our feelings.	71
	5.	More interested in our feelings than in our learning the facts.	4
			100
9	DOES THIS TEACHER SHOW THAT HE WILL HELP YOU WITH SCHOOL WORK AND ALSO HELP YOU WITH ANYTHING ELSE YOU WOULD LIKE TO TALK TO HIM ABOUT?		
	1.	Neither with school work nor anything else.	5
	2.	With school work but nothing else.	10
	3.	More with school work than other things.	41
	4.	About the same with school work and other things.	41
	5.	More with other things than school work.	3
			100
16(R)[a]	DOES THIS TEACHER GIVE YOU CREDIT FOR HOW WELL YOU DO ON YOUR PAPERS AND TESTS OR DOES HE GIVE YOU CREDIT FOR TRYING AND SHOWING IMPROVEMENT?		
	1.	Only for how well I do on papers and tests.	22
	3.	For how well I do on papers and tests and for trying and showing improvement.	58
	5.	For trying and improving whether I do well on papers and tests or not.	20
			100

[a] Reflected

Table III-3. QUESTIONS INCLUDED IN THE SCALE MEASURING THE EXPRESSIVE DIMENSION OF THE TEACHER'S CLASSROOM BEHAVIOR, WITH PERCENTAGE REPLIES FOR THE 2,120 BAY CITY PUPILS

Question Numbers	Questions	Response (percent)
13	IN THIS CLASS ARE YOU SUPPOSED TO USE THE TEACHER'S IDEAS, THE IDEAS IN THE BOOK, OR YOUR OWN IDEAS?	
	1. We are supposed to use our own ideas more than the teacher's or those in the books.	22
	3. We are supposed to use the teacher's ideas, the ideas in the books, and our own ideas.	64
	5. We are only supposed to use the teacher's ideas and the ideas in the books.	14
		100

single score on each item for each teacher. The measure selected was the Kolmogorov-Smirnov statistic, which was computed by comparing responses of the pupils of each teacher with the total distribution of responses for pupils in the sample.[1] This statistic takes into account the shape of the entire frequency distribution. Since the Kolmogorov-Smirnov value may be any number from -100 to 100, arbitrarily defined class intervals were assigned scores and approximate cutting points established. The arbitrary scores were then replaced by the actual Kolmogorov-Smirnov values and the cutting points which minimized error established. For each item, the mean Kolmogorov-Smirnov value above and below the cutting point or points was computed, and teachers received scores based on the sum of the mean values represented by the pattern for the scale type in which they were classified.

The scale measuring task behavior consisted of the seven items reported in Table III-1. The coefficient of reproducibility for the task scale was 90.1 percent and the item scalability was 66.3 percent; the scale included no non-scale types. (See Table III-4) The scale measuring the authority dimension of style contained nine items, (See Table III-2) had a coefficient of reproducibility of 91.6 percent and a coefficient of item scalability of 70.7 percent with no non-scale types. (See Table III-5) The scale measuring expressive behavior containing 11 items, (See Table III-3) had a coefficient of reproducibility of 94.6 percent

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[1] A replication of the study in other school districts could maintain comparability of leadership scores by using the Bay City distribution in computing Kolmogorov-Smirnov scores.

Table III-4. SCALE OF TASK DIMENSION OF TEACHER LEADERSHIP AND SCALE SCORES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	Question Numbers							Teacher Id. No.
		18	21	6	20	14	17	4	
1	28	-32	-35	-29	-21	-21	-26	-16	20
	28	-17	-21	-27	-4	-10	-4	-2	39
	28	-22	-14	-12	-3	-23	3	-11	21
	28	-26	-32	-16	-15	-13	-8	-17	19
	28	-16	-16	-22	-12	-19	-15	-29	3
	28	-22	(5)	-35	-4	-33	-5	5	37
	28	-35	-24	-19	(10)	7	-6	17	32
2	24	-14	-19	-11	-6	7	-5	-16	60
	24	-13	-16	-26	-16	-18	-11	12	67
	24	-5	-25	-23	-18	-7	-13	-5	61
	24	11	-38	-20	-7	-5	-15	-8	45
	24	-5	-18	-27	-7	-9	-5	-13	62
	24	5	-26	-36	-7	9	-12	-5	47
	24	-10	-27	-15	-7	12	-4	11	17
	24	-8	-23	-26	-7	-13	-7	23	55
	24	-7	-20	-19	-17	(14)	-17	-18	78
3	20	(-33)	55	-51	-24	-13	-13	-43	27
	20	25	22	-25	-17	-18	-18	-7	24
	20	49	6	-51	-18	-41	-5	-53	66
	20	7	14	-13	-17	12	-4	19	59
	20	19	7	-11	-3	(14)	-14	-11	79
	20	13	9	-35	-7	(16)	-10	-7	30
	20	7	13	-12	-4	-19	-9	-17	25
	20	-5	4	-18	-6	-25	(12)	-11	33
	20	-4	-5	-33	3	-41	(22)	-11	81
	20	-4	14	-20	-4	(23)	(14)	-8	73
	20	-12	-12	-33	(4)	-19	-7	-23	74
4	14	(-33)	-11	-7	-24	5	(7)	-2	31
	14	(-19)	-8	22	-7	-8	-9	-15	14
	14	(-24)	14	14	-7	-29	-4	-18	29
	14	(-30)	10	24	-13	-9	-11	11	5
	14	7	(-21)	13	-3	(19)	-7	-11	35
	14	26	(-19)	23	3	-16	-11	24	63
	14	-7	-7	5	-9	-18	-17	14	8
	14	18	-8	-4	-12	-14	-7	8	49
	14	11	8	9	-8	6	(5)	-15	51
	14	-9	11	14	-14	10	-15	7	10
	14	-6	-10	5	-9	-20	-7	-7	52
	14	18	-12	13	-4	-43	(35)	12	11
	14	-4	4	16	-7	7	(23)	7	80
	14	-8	12	13	-24	(25)	(5)	-29	12
	14	24	-9	10	3	-24	-3	20	41

Table III-4. SCALE OF TASK DIMENSION OF TEACHER LEADERSHIP AND SCALE SCORES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	18	21	6	20	14	17	4	Teacher Id. No.
5	11	5	2	24	6	-14	(11)	-6	65
	11	27	7	20	13	-14	(13)	9	1
	11	17	48	21	10	-13	-4	(46)	23
6	7	-14	38	28	41	51	-6	-42	4
	7	(-22)	-3	10	5	16	-11	12	64
	7	-10	(-21)	31	20	24	-6	23	6
	7	-4	22	12	9	34	-7	4	36
	7	12	9	5	11	16	-4	-2	75
	7	28	24	49	6	13	-13	3	58
	7	10	(-17)	4	13	28	-1	17	44
	7	-7	32	37	8	22	-26	20	28
7	4	16	(-22)	-4	(-18)	16	11	-11	40
	4	3	(-22)	11	(-7)	26	18	-11	69
	4	-8	33	41	(-13)	34	8	-11	42
	4	7	10	15	(-11)	20	16	-13	56
	4	-8	7	33	(-3)	14	19	-19	15
	4	-8	34	34	(-20)	(-16)	11	23	76
	4	-1	(-25)	(-22)	21	22	21	-11	13
	4	11	19	-11	9	(-3)	14	17	53
	4	44	(-20)	42	47	(-7)	11	23	54
	4	(-23)	5	20	22	7	7	19	71
	4	-13	9	38	40	23	11	-9	22
	4	9	9	29	7	24	8	10	70
	4	34	45	20	36	20	4	19	7
8	0	11	3	9	(-18)	(11)	7	30	50
	0	18	30	40	30	27	9	29	26
	0	-13	20	39	34	38	11	47	9
	0	21	24	27	23	18	7	25	77
Errors		7	10	3	9	10	11	1	
Cutting Points		-15/-14	-14/-13	-11/-10	3/4	12/13	3/4	24/25	
Item Reproducibility		.91	.87	.96	.88	.87	.85	.99	
Item Scalability		.50	.58	.90	.69	.63	.61	.75	

Total Errors: 49

Coefficient of Reproducibility: 90.1%

Coefficient of Item Scalability: 66.3%

Table III-5. SCALE OF AUTHORITY DIMENSION OF TEACHER LEADERSHIP AND SCALE SCORES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	Question Numbers									Teacher
		2	28	31	23	10	22	29	24	5	
5	16	-27	(-51)	-3	13	5	8	10	15	-22	50
	16	21	24	-11	23	-37	-4	10	-24	10	26
	16	35	-12	8	8	-10	-20	7	9	13	23
	16	-47	40	(-20)	11	-25	-12	-11	14	16	74
	16	23	-10	10	10	-14	5	4	12	31	49
	16	27	18	19	7	1	-16	-15	(28)	-14	42
	16	24	40	14	21	-28	-32	-6	-22	(43)	4
	16	14	39	16	7	-34	-14	(13)	7	(33)	6
6	13	11	(-60)	-12	10	17	8	-6	6	-30	39
	13	30	40	(-31)	14	12	-40	-5	-22	12	27
	13	26	40	(-18)	17	21	-11	10	13	19	66
	13	9	44	17	(-19)	11	-3	3	15	22	53
	13	30	9	(-16)	9	16	6	-10	-15	-24	21
	13	29	-24	10	13	22	-11	(26)	10	-12	14
7	10	(-76)	(-42)	(-33)	17	21	17	-21	-10	-25	45
	10	42	(-54)	-13	19	27	20	-2	14	-14	12
	10	-10	(-50)	25	8	24	9	-5	(23)	-53	10
	10	-9	-22	18	(-13)	27	25	-13	-7	-29	31
	10	31	36	-10	15	(-16)	29	-12	(26)	16	75
	10	19	36	20	16	9	11	9	9	-18	24
	10	35	-23	12	13	21	14	4	(19)	-19	40
	10	-44	-29	-13	12	20	12	-10	-10	-11	78
	10	17	-26	3	21	24	22	-11	(28)	-29	67
8	8	32	30	(-17)	8	8	15	18	4	24	64
	8	5	-14	19	12	(-3)	22	21	10	-21	56
	8	24	26	26	12	13	(-13)	18	9	16	73
	8	8	43	15	18	8	(-22)	39	-8	28	69
	8	-31	32	21	17	15	21	23	9	-19	15
	8	8	-14	-12	8	10	32	13	10	-16	30

Table III-5. SCALE OF AUTHORITY DIMENSION OF TEACHER LEADERSHIP AND SCALE SCORES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	Question Numbers									Teacher
		2	28	31	23	10	22	29	24	5	
1	42	-55	-39	-35	-42	-44	-46	-37	-35	-23	22
	42	-48	-47	(-10)	-12	-21	-22	-5	7	-30	44
	42	-55	-57	(-12)	-19	-28	-15	-17	-18	-53	32
2	36	-31	-43	-15	-36	-4	-16	-6	-37	-36	72
	36	-9	-39	-32	-53	-55	6	-30	-44	-19	71
	36	4	-47	-18	-5	6	2	-10	9	13	70
	36	-20	-32	-25	-19	-6	5	-17	-41	-12	29
	36	26	-47	-17	-10	(8)	-6	-8	5	-37	37
	36	10	-38	-18	-11	-4	(14)	-9	13	-16	60
	36	5	-57	-29	(19)	3	-22	-13	-4	-56	41
	36	-41	-38	-16	1	-14	-10	(13)	-15	-36	7
3	30	12	6	-22	-17	-28	-18	-21	-28	-28	11
	30	23	10	-23	-4	-4	-11	-12	-14	-13	63
	30	18	28	-14	-4	6	-4	8	-18	-5	33
	30	31	-21	-14	-35	-30	-42	-30	-23	15	57
	30	-42	-15	-18	-10	4	(38)	-27	-7	-30	3
	30	-12	-16	-19	-15	-25	-3	-5	-1	-20	48
4	27	11	9	-5	-18	-51	-33	-9	-24	-31	77
	27	33	-12	-11	-6	3	-11	-9	11	16	79
	27	32	38	17	-4	-6	-20	-7	-12	16	65
	27	-3	-20	-4	-31	-25	-7	-13	-9	-24	1
	27	8	-16	-12	-10	(12)	-8	-5	-2	12	59
	27	-10	20	12	-13	-18	-12	7	-19	20	13
	27	-12	-26	8	-18	-20	-4	8	-26	12	62
	27	-44	15	9	-7	-19	-9	(13)	-6	12	75
	27	35	42	13	-20	6	-47	(40)	(28)	-9	54
	27	1	40	13	-26	-3	-19	-15	-47	(45)	36
	27	-33	36	43	-8	-7	-4	-19	11	(75)	55

Table III-5. SCALE OF AUTHORITY DIMENSION OF TEACHER LEADERSHIP AND SCALE SCORES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	Question Numbers 2	28	31	23	10	22	29	24	5	Teacher
	8	16	-17	22	13	27	7	11	12	-11	19
	8	-2	39	-12	10	18	(-8)	16	15	(45)	8
	8	-21	41	(-17)	15	13	20	20	-4	21	55
	8	-25	31	7	10	16	19	17	-11	19	52
	8	5	-28	19	24	10	9	31	-9	-15	17
9	5	16	22	9	16	(-5)	(-19)	34	18	7	9
	5	31	5	-8	14	24	16	21	16	-26	80
	5	-25	-24	10	5	15	25	(-9)	27	11	47
	5	(-52)	-16	-5	10	21	30	35	29	-22	20
	5	-19	32	17	5	15	21	(7)	19	-8	51
10	0	26	24	19	(-10)	8	(-25)	21	16	29	58
	0	6	40	25	10	15	21	(-8)	16	48	28
	0	19	41	19	7	11	14	(-5)	18	47	43
	0	9	38	53	20	24	18	20	29	32	25
	0	-18	(-38)	-6	8	9	28	(8)	17	32	81
	0	5	40	23	17	(5)	(-11)	19	16	47	61
	0	-35	40	13	5	15	13	11	19	58	35
Errors		2	6	9	4	6	8	10	6	5	
Cutting Points		-48/-47	-32/-31	-14/-13	4/5	6/7	8/9	10/11	15/16	28/29	
Item Reproducibility		.97	.92	.88	.95	.92	.89	.87	.92	.93	
Item Scalability		.60	.65	.60	.87	.84	.71	.57	.33	.33	P

Total Errors: 56
Coefficient of Reproducibility: 91.6%
Coefficient of Scalability 70.7%

Table III-6. SCALE OF EXPRESSIVE DIMENSION OF TEACHER LEADERSHIP AND SCALE SCORES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	Question Numbers 19	27	30	26	25	32	11	9	16	12	13	Teacher
1	36	-46	-25	-34	-38	-36	-32	-26	-11	-12	-18	-18	12
	36	-48	-16	-26	-46	-35	-33	-21	-16	-12	-22	-11	20
	36	-40	-33	-18	-32	-23	-52	-22	-12	-10	-14	-9	67
	36	-21	-25	-28	-32	-28	-36	-20	-5	-15	-12	3	19
	36	-26	-16	-26	-36	-23	-29	-27	-12	7	-13	4	45
	36	-48	-37	-24	-28	-32	-36	-38	-8	-10	-10	14	52
	36	-23	-20	-15	-15	-25	-31	-20	-24	3	-17	10	51
	36	-26	-30	-38	-22	-29	-33	-19	-11	-13	-6	-14	30
	36	-32	-28	-21	-32	-24	-19	(7)	-41	-12	-18	22	27
2	34	-20	-22	-21	-23	-27	-23	-22	9	-15	-2	14	17
	34	-16	-26	-15	-34	-23	-33	-21	-20	-16	-16	10	31
	34	-9	-14	-26	(-11)	-28	-10	-6	-12	(16)	-8	13	80
	34	-13	-16	-19	-33	-16	-17	-9	-10	9	-6	-6	8
	34	-9	-25	-47	-16	-24	-19	-20	(14)	-2	-19	-11	64
3	31	10	-11	-34	-14	-37	-24	-7	-17	-13	4	-19	28
	31	(14)	-13	-23	-18	-26	(57)	-17	3	-18	-6	-11	24
	31	-13	-10	-24	-19	-31	(25)	-14	-5	(16)	-4	-21	55
4	28	-13	-12	-9	-19	-16	4	-20	-9	(17)	-6	-14	40
	28	-9	-13	9	-12	-10	-19	-15	(13)	-13	-12	-9	50
	28	-20	-9	-6	-34	-16	-16	(3)	-5	3	-10	9	47
	28	-12	(-16)	13	-18	-13	(11)	-18	-10	9	-20	-14	14
5	25	-6	(-20)	-6	-11	-17	-11	-16	-7	-24	-13	-9	25
	25	-11	7	-13	-11	-28	(34)	-20	-11	(10)	-6	-3	21
	25	-13	(-17)	-9	-9	-25	-15	-5	-25	-13	-21	13	81
	25	-12	-9	6	-10	-12	-18	-12	-5	-23	-8	12	56
	25	(-44)	21	-3	-9	-10	-26	-18	-44	-55	-37	16	66
6	22	-9	12	-6	(-17)	18	-17	(23)	4	-12	-22	-6	49
	22	7	(-19)	-12	6	-8	-17	-20	(18)	(16)	4	-14	37

Table III-6. SCALE OF EXPRESSIVE DIMENSION OF TEACHER LEADERSHIP AND SCALE SCORES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	Question Numbers											Teacher
		19	27	30	26	25	32	11	9	16	12	13	
	22	11	(-17)	14	(34)	12	-20	-14	-23	5	-4	-14	42
	22	-12	-3	-9	4	13	4	-15	-8	-8	13	-16	39
	22	-11	10	18	8	19	-9	-6	-19	-21	-4	-34	5
7	19	-12	11	14	-10	5	8	-10	(14)	7	-12	-4	43
	19	-15	7	30	-11	20	(44)	-15	-22	-11	-4	-13	10
	19	-3	12	13	-11	3	5	-12	-12	-14	-13	-10	35
	19	-15	8	16	-7	6	13	-1	-24	-8	(7)	-14	53
	19	-13	18	18	-5	9	13	-5	-6	4	-6	-11	61
	19	-12	15	-7	9	(14)	15	-9	4	6	3	7	33
	19	13	-9	(-15)	-11	10	17	-9	-15	18	-17	18	15
	19	-19	7	30	-5	20	11	-12	2	-11	(13)	5	73
	19	5	18	-8	(24)	14	11	-7	6	(27)	(7)	14	7
	19	13	44	29	(21)	29	(29)	-16	-10	-4	-6	5	69
8	16	-9	-10	(-22)	8	13	9	16	-11	7	-4	-12	3
	16	-19	15	17	5	-9	(25)	14	-15	-10	-9	-5	62
	16	-9	5	-2	-5	19	15	7	-13	-11	4	9	65
	16	-7	10	-4	15	19	14	38	6	-10	-11	3	36
	16	-8	-7	23	(-20)	6	10	23	(13)	-11	-6	-6	78
9	13	14	(-16)	10	-3	-6	10	6	-26	-6	-18	-7	23
	13	15	13	-12	-11	(-14)	14	16	-8	(34)	-6	23	58
	13	14	14	12	11	(-11)	18	16	-8	-15	6	15	63
	13	22	13	18	(34)	22	11	32	-8	-5	16	-19	74
	13	21	-8	25	17	(-13)	10	23	-10	-6	11	2	75
	13	25	-8	-8	13	21	10	25	8	8	17	18	79
	13	19	23	9	24	13	13	5	(-29)	(16)	-15	-8	1
	13	26	-7	-12	6	-5	9	30	-16	6	20	-5	70
10	12	26	12	9	17	-5	14	(-2)	23	9	-6	-23	44
	12	22	-13	-10	-3	(-14)	7	(-9)	14	9	-14	-7	59
	12	19	16	14	17	14	14	19	16	-10	10	-10	48
	12	20	11	17	3	21	22	25	14	-6	4	-11	9

Table III-6. SCALE OF EXPRESSIVE DIMENSION OF TEACHER LEADERSHIP AND SCALE SCORES OF 74 BAY CITY TEACHERS

Scale Type	Scale Scores	Question Numbers											Teacher
		19	27	30	26	25	32	11	9	16	12	13	
10	8	(12)	-7	19	26	26	30	12	21	-5	(33)	15	32
11	6	19	33	33	42	34	37	32	29	18	7	-4	76
	6	23	33	13	(11)	23	23	22	11	11	11	9	29
	6	31	18	16	30	18	29	16	10	14	13	-3	13
	6	26	13	12	21	27	30	19	13	20	-5	13	6
	6	14	-12	-6	10	10	(8)	(-6)	24	12	4	19	72
	6	40	23	9	28	16	(13)	26	26	27	20	5	4
12	3	39	10	-5	(17)	20	(16)	17	25	20	23	-14	41
	3	49	28	21	33	39	26	33	20	26	27	6	26
	3	46	40	42	42	50	47	28	46	28	39	11	54
	3	(7)	22	16	37	7	33	6	14	11	29	19	11
13	0	38	25	42	24	50	37	36	42	10	43	50	57
	0	21	34	28	33	46	46	23	15	10	25	29	77
	0	21	11	15	(13)	32	30	11	26	18	28	25	71
	0	30	43	24	56	39	34	32	26	33	32	28	22
Error Dichotomized		1	6	2	3	5	4	6	6	8	1	0	
Error Trichotomized		4			10		9						
Cutting Points		-21/-20 13/14	-13/-14	-15/-16	-12/-11 20/21	-10/-9	-4/5 22/23	1/-1	9/10	9/10	20/21	24/25	
Item Reproducibility		.95	.92	.97	.96	.93	.95	.92	.92	.89	.99	1.00	
Item Scalability		.89	.70	.90	.86	.84	.86	.81	.76	.64	.89	1.00	

Total Scale Errors	4.5 (all items dichotomized except item 19)
Coefficient of Reproducibility.	94.6% (with 19 trichotomized)
Coefficient of Reproducibility.	91.6% (with 19, 26, and 32 trichotomized)
Coefficient of Item Scalability.	83.2% (with 19 trichotomized)

and a coefficient of item scalability of 83.2 percent with one item retained as a trichotomy. No non-scale types were created. (See Table III-6)

Interrelationships of Teacher Leadership Dimensions

Some hypotheses deriving from theoretical considerations and confirmed by the pilot study predicting the nature of interrelationships among the teacher leadership dimensions were tested by the present study.

Hypotheses: Relationship among teacher leadership dimensions:

III-1. There will be a generally negative relationship between authority and task scores.

III-2. There will be a generally negative relationship between authority and expressive scores.

III-3. There will be a generally positive relationship between task and expressive scores.

The findings confirmed these hypotheses and replicated in large measure the findings of the pilot study. The following Tau coefficients of rank correlation were obtained for the Bay City teachers (See Chapter I for correlation coefficients of the pilot study):

$\tau_{T.A.} = -.09$ (not significant at five percent)
$\tau_{T.E.} = .32$ (significant at one percent)
$\tau_{E.A.} = -.47$ (significant at one percent)

The partial correlations among leadership dimension scores were:

$r_{TA.E.} = .08$

$r_{TE.A.} = .47$

$r_{EA.T.} = .20$

The greatest change in the correlation coefficients between dimensions for the pilot study compared to the current study was for the relationship between task and authority, which relationship was reduced in the current study to non-significance. Apparently this resulted from shifting the affective content out of the task scale into the expressive scale. Accordingly the correlation between task and expressive dimensions increased.

A fourth variable related to teacher leadership; Assigned Work Volume, was measured. It was provided as a possible control, but the relationship of Work Volume defined by the teacher resulted in consistent non-significant correlations. It is reported only in relation to pupil morale for which some significant correlation coefficients were obtained.

Modes of Teacher Leadership

The theoretical formulation of teacher leadership, consisting of three dimensions for which predictions were made of their separate effects on pupil learning gain, morale, and compliance, also anticipated that the most adequate understanding of the relationship of teacher leadership to effects on pupils would come from viewing given effect (gain, morale, compliance) as a function of the three combined dimensions of teacher leadership, with the effect of a given level of performance on any one dimension depending on the level of performance of the other two dimensions. The concept of teacher leadership mode was used to refer to the defined combination of levels of performance on three dimensions at the same time.

Teacher leadership modes were formed by combining leadership scale scores between designated cutting points on each of the three leadership scales. The curves from the regression analysis of total gain on the three leadership scale scores were used as guides to establish cutting points which tended to maximize differences in total gain among teacher leadership modes. (Figures IV-1 to IV-5) In Table III-7 are shown the leadership modes which resulted from cutting the task scale into two segments, viz., (1) low, (2) middle and high; the authority and expressive scales were each cut into three segments, viz., (1) low, (2) middle and (3) high.

When the dimensions were cross-classified, the sample of teachers was distributed into only 12 of the 18 cells established. The modes formed by this procedure now constitute leadership variables with the various levels of the three dimensions which were combined. These modes when related to gain made possible the measurement of the influence of their combined effect or the examination of levels of performance on one dimension with the others held constant.

In Tables III-8, III-9, and III-10 are shown the percentages of teachers at each level of the given dimension of teacher behavior according to the median responses of their classes to the questions from which the scales were constituted.

Table III-7. TEACHER LEADERSHIP MODES DEFINED BY COMBINING LEADERSHIP SCALE SCORES OF 74 BAY CITY TEACHERS IN RELATION TO PUPIL ADJUSTED TOTAL GAIN ON THREE STEP TESTS, READING, WRITING, AND MATHEMATICS

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	Mode				H		
		N				17		
	Middle (12-28)	Mode	B	D	F	G	J	L
		N	6	2	1	14	11	8
	Low (0-8)	Mode	A	C	E		I	K
		N	1	4	3		2	5

Table III-8. PERCENTAGES OF TEACHERS AT THREE LEVELS OF TASK BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE SEVEN QUESTIONS OF THE TASK SCALE, 74 BAY CITY TEACHERS

NO.	QUESTIONS	TASK BEHAVIOR LEVELS Low (Scores 0-4) (percent)	Middle and High (Scores 7-28) (percent)
18	ARE YOU GIVEN NEW WORK IN ARITHMETIC BEFORE YOU ARE ABLE TO GET THE RIGHT ANSWERS TO THE OLD WORK?		
	1. I am not given new kinds of arithmetic until I can do the old kind correctly.	47	2
	3. I am sometimes given new kinds of arithmetic before I can do the old kind.	47	96
	5. I am almost always given a new kind of arithmetic before I can do the old kind.	6	2
		100	100
21	DOES THE TEACHER SEE TO IT THAT YOU COMPLETE ALL OF THE WRITTEN ASSIGNMENTS OR NOT?		
	1. Makes sure we complete practically all written assignments.	0	11
	3. Sometimes makes sure we complete written assignments.	71	77
	5. Hardly ever makes sure we complete written assignments.	29	12
		100	100

Table III-8. PERCENTAGES OF TEACHERS AT THREE LEVELS OF TASK BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE SEVEN QUESTIONS OF THE TASK SCALE, 74 BAY CITY TEACHERS

NO.	QUESTIONS		TASK BEHAVIOR LEVELS Low (Scores 0-4) (percent)	Middle and High (Scores 7-28) (percent)
6	DOES THIS TEACHER GO OVER A DAY'S WORK WITH YOU AGAIN BEFORE GOING ON TO THE NEXT LESSON, OR DO YOU GO ON WITHOUT REVIEWING?			
	1.	Reviews every lesson (either at the end or the beginning).	0	0
	3.	Reviews most lessons.	23	58
	4.	Reviews some lessons but not regularly.	59	42
	5.	Hardly ever reviews lessons.	18	0
			100	100
20	WHAT DOES THIS TEACHER MOST OFTEN DO WHEN HE IS TEACHING THE CLASS SOMETHING NEW AND THE PUPILS DON'T UNDERSTAND?			
	1.	Tries to explain it again another way.	71	98
	3.	Gives the same explanation over again.	29	2
	5.	Moves on to something else even though we don't understand.	0	0
			100	100

Table III-8. PERCENTAGES OF TEACHERS AT THREE LEVELS OF TASK BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE SEVEN QUESTIONS OF THE TASK SCALE, 74 BAY CITY TEACHERS

NO.	QUESTIONS	TASK BEHAVIOR LEVELS Low (Scores 0-4) (percent)	Middle and High (Scores 7-28) (percent)
14	HOW OFTEN ARE YOU REQUIRED TO SHOW THE TEACHER (BY WRITING OR TELLING THE ANSWER TO A QUESTION OR A PROBLEM) THAT YOU UNDERSTAND WHAT IS BEING TAUGHT?		
	1. Several times every day.	0	2
	2. Once every day.	0	5
	3. Almost every day.	6	39
	4. Several times a week.	88	54
	5. Never.	6	0
		100	100
17	WHEN YOU HAVE LEARNED A CERTAIN KIND OF ARITHMETIC, DO YOU USE IT OVER AGAIN DURING THE YEAR OR STOP USING IT AFTER YOU HAVE TAKEN UP A DIFFERENT KIND OF PROBLEM?		
	1. Keep using a kind of arithmetic over and over again.	0	0
	3. Keep using a kind of arithmetic sometimes after we have taken up a new kind.	100	98
	5. Hardly ever use an old kind of arithmetic after we have taken up a new kind.	0	2
		100	100

Table III-8. PERCENTAGES OF TEACHERS AT THREE LEVELS OF TASK BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE SEVEN QUESTIONS OF THE TASK SCALE, 74 BAY CITY TEACHERS

NO.	QUESTIONS	TASK BEHAVIOR LEVELS Low (Scores 0-4) (percent)	Middle and High (Scores 7-28) (percent)
4	HOW ARE YOUR PAPERS USUALLY CORRECTED?		
	5. All mistakes are marked and we are shown how the work is wrong.	18	24
	4. All mistakes are marked.	76	74
	2. A grade or comment for the whole paper is given but all mistakes are not marked.	6	0
	1. I don't know, papers aren't returned.	0	2
		100	100
	Number of Teachers	17	57

Table III-9. PERCENTAGES OF TEACHERS AT THREE LEVELS OF AUTHORITY BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE NINE QUESTIONS OF THE AUTHORITY SCALE, 74 BAY CITY TEACHERS

NO.	QUESTIONS	AUTHORITY BEHAVIOR LEVEL Low (Scores 0-13)	 Middle (Scores 16-27)	 High (Scores 30-42)
		(percent)	(percent)	(percent)
2	DO PUPILS HAVE TO GET PERMISSION TO LEAVE THEIR SEATS IN THIS CLASS OR NOT?			
	1. We can never leave our seats without getting permission.	5	0	6
	2. We can leave our seats without permission if we follow certain rules.	26	37	35
	5. We can leave our seats without getting permission almost any time.	69	63	59
		100	100	100
28	HOW MUCH INSTRUCTION DOES THE TEACHER GIVE A SOCIAL STUDIES COMMITTEE?			
	1. We never have social studies committees.	39	21	70
	2. The teacher tells the committee exactly what to do and how to do it.	0	0	12
	4. The teacher tells the committee what to do, but lets us decide how to do it.	53	74	18
	5. The teacher leaves almost everything up to the committee.	8	5	0
		100	100	100

Table III-9. PERCENTAGES OF TEACHERS AT THREE LEVELS OF AUTHORITY BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE NINE QUESTIONS OF THE AUTHORITY SCALE, 74 BAY CITY TEACHERS

NO.	QUESTIONS	AUTHORITY BEHAVIOR LEVEL		
		Low (Scores 0-13) (percent)	Middle (Scores 16-27) (percent)	High (Scores 30-42) (percent)
31	WHEN THE CLASS STARTS A NEW SOCIAL STUDIES UNIT, WHO PLANS HOW YOU WILL DO THE WORK?			
	1. We do it the way the teacher plans it.	45	69	100
	2. The teacher and the pupils plan it together.	52	26	0
	4. The teacher expects the pupils to work out a plan, but he gives advice if we ask him.	3	5	0
	5. The plan is entirely up to the pupils.	0	0	0
		100	100	100
23	WHEN THE TEACHER HAS MADE UP HIS MIND ABOUT SOMETHING, HAS HE EVER CHANGED IT WHEN THE PUPILS OBJECTED?			
	1. Hardly ever.	0	16	24
	2. A few times when the pupils had good reasons.	100	84	76
	4. Quite often, whether the pupils had good reasons or not.	0	0	0
	5. Practically every time anyone objected.	0	0	0
		100	100	100

Table III-9. PERCENTAGES OF TEACHERS AT THREE LEVELS OF AUTHORITY BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE NINE QUESTIONS OF THE AUTHORITY SCALE, 74 BAY CITY TEACHERS

NO.		QUESTIONS	AUTHORITY BEHAVIOR LEVEL Low (Scores 0-13)	 Middle (Scores 16-27)	 High (Scores 30-42)
			(percent)	(percent)	(percent)
10		WHAT DOES THE TEACHER DO WHEN HE AND THE PUPILS DISAGREE ABOUT SOME IDEA IN SOCIAL STUDIES?			
	1.	Doesn't encourage pupils to express opinions.	0	0	0
	3.	Lets pupils express their opinions, but only sees his side.	0	37	35
	5.	Lets pupils express their opinions and we look at both sides.	100	63	65
			100	100	100
22		WHEN THE TEACHER ASKS PUPILS TO DO SOMETHING THEY DO NOT WANT TO DO, DOES HE OR DOES HE NOT EXPLAIN WHY THEY HAVE TO DO IT?			
	5.	He hardly ever explains why.	8	26	24
	3.	He sometimes explains why.	79	74	71
	1.	He almost always explains why.	13	0	6
			100	100	100

Table III-9. PERCENTAGES OF TEACHERS AT THREE LEVELS OF AUTHORITY BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE NINE QUESTIONS OF THE AUTHORITY SCALE, 74 BAY CITY TEACHERS

NO.	QUESTIONS	AUTHORITY BEHAVIOR LEVEL		
		Low (Scores 0-13) (percent)	Middle (Scores 16-27) (percent)	High (Scores 30-42) (percent)
29	HOW OFTEN WOULD YOU SAY THIS TEACHER HAS CHANGED ASSIGNMENTS THIS YEAR BECAUSE THE PUPILS OBJECTED TO THEM?			
	1. Hardly ever.	60	100	100
	2. A few times when the pupils had good reasons.	40	0	0
	4. Quite often, whether the pupils had good reasons or not.	0	0	0
	5. Practically every time anyone objected.	0	0	0
		100	100	100
24	AFTER YOU KNOW WHAT YOU ARE GOING TO DO IN THIS CLASS. WHO USUALLY DECIDES HOW YOU ARE GOING TO DO IT?			
	1. The teacher decides and tells us.	0	11	29
	2. The teacher listens to our ideas about it, but he decides.	26	63	47
	4. The teacher talks it over with us, and helps us decide.	74	26	24
	5. The teacher lets us decide.	0	0	0
		100	100	100

Table III -9. PERCENTAGES OF TEACHERS AT THREE LEVELS OF AUTHORITY BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE NINE QUESTIONS OF THE AUTHORITY SCALE, 74 BAY CITY TEACHERS

NO.	QUESTIONS		AUTHORITY BEHAVIOR LEVEL Low (Scores 0-13) (percent)	Middle (Scores 16-27) (percent)	High (Scores 30-42) (percent)
5	HOW MANY COMMITTEES HAVE YOU BEEN ON THIS YEAR IN THIS CLASS?				
	1.	None.	3	0	29
	2.	One or two.	58	43	71
	3.	Three.	21	26	0
	4.	Four.	8	26	0
	5.	Five or more.	10	5	0
			100	100	100
	Number of Teachers		38	19	17

Table III-10. PERCENTAGES OF TEACHERS AT THREE LEVELS OF EXPRESSIVE BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE ELEVEN QUESTIONS OF THE EXPRESSIVE SCALE, 74 BAY CITY TEACHERS

NO.	QUESTIONS	EXPRESSIVE BEHAVIOR LEVEL Low (Scores 0-8)	Middle (Scores 12-28)	High (Scores 31-36)
		(percent)	(percent)	(percent)
19	DOES THIS TEACHER SHOW THAT HE WANTS TO MAKE THE WORK INTERESTING FOR THE PUPILS OR DOES HE NOT?			
	1. Almost always interesting.	0	10	71
	2. Sometimes interesting.	67	90	29
	4. Not very interesting.	33	0	0
	5. Practically never interesting.	0	0	0
		100	100	100
27	DOES THE TEACHER ASK YOU QUESTIONS IN A WAY WHICH MAKES YOU NERVOUS AND UNCOMFORTABLE ABOUT ANSWERING THEM, OR DOES HE ASK YOU QUESTIONS IN A KIND WAY?			
	1. Just about always kind.	0	0	18
	2. Often kind, but occasionally makes me uncomfortable.	33	95	82
	4. Often makes me feel nervous and uncomfortable, but not always.	67	5	0
	5. Just about always makes me nervous and uncomfortable.	0	0	0
		100	100	100

Table III-10. PERCENTAGES OF TEACHERS AT THREE LEVELS OF EXPRESSIVE BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE ELEVEN QUESTIONS OF THE EXPRESSIVE SCALE, 74 BAY CITY TEACHERS

NO.	QUESTIONS	EXPRESSIVE BEHAVIOR LEVEL Low (Scores 0-8)	 Middle (Scores 12-28)	 High (Scores 31-36)
		(percent)	(percent)	(percent)
30	DOES THIS TEACHER SHOW THAT HE DISLIKES PUPILS IN THE CLASS OR NOT?			
	1. Shows dislike for none of the pupils.	0	7	94
	2. Shows dislike for a few pupils.	87	93	6
	3. Shows dislike for some pupils.	13	0	0
	4. Shows dislike for most pupils.	0	0	0
	5. Shows dislike for everyone in the class.	0	0	0
		100	100	100
26	DOES THIS TEACHER TRY TO MAKE THE CLASS ENJOYABLE FOR THE PUPILS OR NOT?			
	1. Almost always tries to make the class enjoyable.	0	33	100
	3. Sometimes tries to make the class enjoyable.	87	67	0
	5. Practically never tries to make the class enjoyable.	13	0	0
		100	100	100

Table III-10. PERCENTAGES OF TEACHERS AT THREE LEVELS OF EXPRESSIVE BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE ELEVEN QUESTIONS OF THE EXPRESSIVE SCALE, 74 BAY CITY TEACHERS

NO.	QUESTIONS		EXPRESSIVE BEHAVIOR LEVEL		
			Low (Scores 0-8)	Middle (Scores 12-28)	High (Scores 31-36)
			(percent)	(percent)	(percent)
25	DOES THIS TEACHER SHOW THAT HE LIKES PUPILS IN THIS CLASS OR NOT?				
	1.	Shows he likes all pupils.	0	5	94
	2.	Shows he likes most pupils.	47	90	6
	3.	Shows he likes some pupils.	47	5	0
	4.	Shows he likes just a few pupils.	6	0	0
	5.	Shows liking for none of the pupils.	0	0	0
			100	100	100
32	IS THIS TEACHER USUALLY FAIR OR USUALLY UNFAIR WHEN HE DECIDES THINGS ABOUT PUPILS?				
	1.	He is always fair.	0	0	41
	2.	He is usually fair.	0	64	59
	4.	He is fair to most pupils, a few are treated better; a few are treated worse.	87	36	0
	5.	He is unfair to most pupils.	13	0	0
			100	100	100

Table III-10. PERCENTAGES OF TEACHERS AT THREE LEVELS OF EXPRESSIVE BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE ELEVEN QUESTIONS OF THE EXPRESSIVE SCALE, 74 BAY CITY TEACHERS

NO.	QUESTIONS	EXPRESSIVE BEHAVIOR LEVEL Low (Scores 0-8)	Middle (Scores 12-28)	High (Scores 31-36)
		(percent)	(percent)	(percent)
9	DOES THIS TEACHER SHOW THAT HE WILL HELP YOU WITH SCHOOL WORK AND ALSO HELP YOU WITH ANYTHING ELSE YOU WOULD LIKE TO TALK TO HIM ABOUT?			
	5. More with other things than school work.	0	0	0
	4. About the same with school work and other things.	7	31	53
	3. More with school work and other things.	80	69	47
	2. With school work, but nothing else.	13	0	0
	1. Neither with school work nor anything else.	0	0	0
		100	100	100
16	DOES THIS TEACHER GIVE YOU CREDIT FOR HOW WELL YOU DO ON YOUR PAPERS AND TESTS OR DOES HE GIVE YOU CREDIT FOR TRYING AND SHOWING IMPROVEMENT?			
	5. For trying and improving whether I do well on papers and tests or not.	0	2	0
	3. For how well I do on papers and tests and for trying and showing improvement.	87	96	100
	1. Only for how well I do on papers and tests.	13	2	0
		100	100	100

Table III-10. PERCENTAGES OF TEACHERS AT THREE LEVELS OF EXPRESSIVE BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE ELEVEN QUESTIONS OF THE EXPRESSIVE SCALE, 74 BAY CITY TEACHERS

NO.		QUESTIONS	EXPRESSIVE BEHAVIOR LEVEL Low (Scores 0-8) (percent)	Middle (Scores 12-28) (percent)	High (Scores 31-36) (percent)
11		DOES THIS TEACHER HELP YOU WITH THE WORK OR LET YOU GET IT FOR YOURSELF?			
	5.	I get all the help I need.	33	71	100
	3.	I get some help but not as much as I need.	67	29	0
	1.	I hardly get any help.	0	0	0
			100	100	100
12		DOES THE TEACHER MAKE SURE YOU LEARN THE FACTS OR IS HE MORE INTERESTED IN HOW PUPILS FEEL ABOUT THINGS?			
	5.	More interested in our feelings than in our learning the facts.	0	0	0
	4.	Makes sure we learn the facts, but is sometimes interested in our feelings.	47	100	100
	2.	Just makes sure we learn the facts.	53	0	0
	1.	Shows little or no concern about the facts or how we feel.	0	0	0
			100	100	100

Table III-10. PERCENTAGES OF TEACHERS AT THREE LEVELS OF EXPRESSIVE BEHAVIOR ACCORDING TO THE MEDIAN RESPONSES OF THEIR CLASSES TO THE ELEVEN QUESTIONS OF THE EXPRESSIVE SCALE, 74 BAY CITY TEACHERS

NO.	QUESTIONS	EXPRESSIVE BEHAVIOR LEVEL Low (Scores 0-8) (percent)	 Middle (Scores 12-28) (percent)	 High (Scores 31-36) (percent)
13	IN THIS CLASS ARE YOU SUPPOSED TO USE THE TEACHER'S IDEAS, THE IDEAS IN THE BOOK, OR YOUR OWN IDEAS?			
	1. We are supposed to use our own ideas more than the teacher's or those in the books.	0	2	0
	3. We are supposed to use the teacher's ideas, the ideas in the books, and our own ideas.	93	98	100
	5. We are only supposed to use the teacher's ideas and the ideas in the books.	7	0	0
		100	100	100
	Number of Teachers	15	42	17

A comparison of low with middle and high task teachers for the data presented in Table III-8 indicated again that the range of teacher variability was limited on this dimension. The difference between the two groups of teachers was quite small for three of the four questions. Low task teachers tended to introduce new work more slowly at least in mathematics. Since introduction of new work in arithmetic before everyone had learned the old was considered poor programming, it was expected to occur at the lower end of the task scale. This was confirmed but, nevertheless, the range of scores and the scale error combined to permit low task teachers to score higher than middle and high task teachers on this item. This probably indicated that high task teachers were tending to program for faster learners while low task teachers were tending to program for the slower learners.

Low task teachers were somewhat less likely to make sure that written work was completed and considerably less likely to review lessons or to require frequent evidence of learning from the pupil. Comparing teachers using low, middle, and high authority modes (Table III-9), it is seen that for questions 31, 23, and 24 there was a progression for the three levels of authority behavior in the direction indicated. Two of these had to do with planning work (question 24 and question 31) and one with the extent to which pupils could influence a teacher to change his decision. On three questions 10, 22, and 29 there was little or no difference between middle and high authority teachers. All these dealt in one way or another with the crediting of pupils' opinions. Questions 28 and 5 indicated that middle authority teachers were more likely than either of the other two to delegate authority to committees. The middle authority teacher tended to be like high authority teachers in giving pupils the impression that he did not credit their judgment in the decision-making. At the same time he was more likely than the low authority teacher to distribute his authority through delegation of decisions with respect to work in pupil committees.

The data in Table III-10 indicates that for eight of the 11 expressive scale questions there was a clear progression of responses in the direction implied by the scores. Questions 16 and 13 differentiated the three levels of expressive behavior very poorly. Question 12 indicated that all teachers at both the middle and high level of expressive behavior gave their pupils the impression that they were interested in the pupils' feelings while one-half of the low expressive teachers were thought by their pupils to be interested only in their learning facts. The response to questions 27, 30, 25, 32, and 11 might lead to the hypothesis that the middle expressive teacher is much less likely to be viewed as unkind, unfair, or unconcerned than the low expressive teacher. He is, on the other hand, not as uniformly reassuring as the high expressive teacher, maintaining a certain level of tension in the classroom, especially for pupils whose performance was "not measuring up."

CHAPTER IV

RELATIONSHIP OF TEACHER LEADERSHIP TO PUPIL PRODUCTIVITY

The major objective of the study was to observe the effects of teacher leadership on pupil productivity. Learning gain in reading, writing, and mathematics as measured by a standard achievement test was used as the measure of pupil productivity. A fourth productivity score was obtained by summing these three test scores. The procedures by which a teacher's adjusted pupil gain score was obtained is described in Chapter II. Hypothesis II states the expected relationship between leadership dimensions and pupil gain.

The Non-Linear Relationship of Leadership Dimensions to Gain

> Hypothesis IV-1. Relationships between individual independent and dependent variables will be curvilinear; high scores on the expressive and task dimensions and low scores on the authority dimension will tend to be favorable to learning achievement. However, increasing use of expressive and task will either level off in effect on gain or become less effective.

The linear correlation between leadership scale scores and the gain scores were low and non-significant. To find the regression line which would define the non-linear relationship which Hypothesis II predicted, polynomial equations were used to transform the leadership scale scores. Regression analysis of the gain scores on the transformed leadership scores produced five which were significantly different from linear. All authority regressions were significantly different from linear; regression of reading on the expressive dimension was significantly different from linear; no regression on the task dimension differed significantly from a linear regression. These non-linear regression lines are shown in Figures IV-1 through IV-5.

The regression of reading gain on the expressive scale scores indicates that both high and low expressive scores produced low gain. (Figure IV-1) High expressive scores showed lower gain than low expressive scores; the highest reading gain was for middle expressive scores.

$$Y = -0.68870+0.00622X_E^2-0.00018X_E^3 \tag{4.1}$$

While they were not significant, the curves for writing and total gain were similar to reading, showing some decline for high expressive scores; however, the regression for mathematics gain on the expressive scores, also non-significant, did not decline for high expressive scores.

All of the regressions of gain scores on authority scores indicate that increasing authority produced less gain over most of the range of the authority scale. (Figures IV-2 to IV-5) The lowest gain was produced by authority scores in the middle range. However, the three highest authority teachers produced higher gain on all three tests and on total gain than did teachers using any other level of authority. The next highest gain on all regressions was obtained by those teachers using the least authority. The total gain scores of the highest and lowest authority teachers were almost equal. The equations for the regressions of the four gain scores on the authority scale scores follow:

Total gain scores on authority scale scores

$$Y = 2.44566 - 0.27419X_A + 0.00016X_A^3 \qquad (4.2)$$

Reading gain on authority scale scores

$$Y = 0.42045 + 0.00679X_A - 0.00597X_A^2 + 0.00015X_A^3 \qquad (4.3)$$

Mathematics gain on authority scale scores

$$Y = 0.31903 + 0.00697X_A - 0.00421X_A^2 + 0.00010X_A^3 \qquad (4.4)$$

Writing gain on authority scale scores

$$Y = 1.00043 - 0.10734X_A + 0.00006X_A^3 \qquad (4.5)$$

The regression of the gain scores on the task scale scores, none of which differed significantly from linear, indicated an increase in all gain scores with an increase in task scores up to a leveling off with middle task scores. Middle task scores and high task scores were equally high for reading and writing gain. Both total gain and mathematics scores tended to decline for the high task scores.

Among the three leadership variables, the expected scores produced by the regressions on task scores exhibited the smallest range. There are several

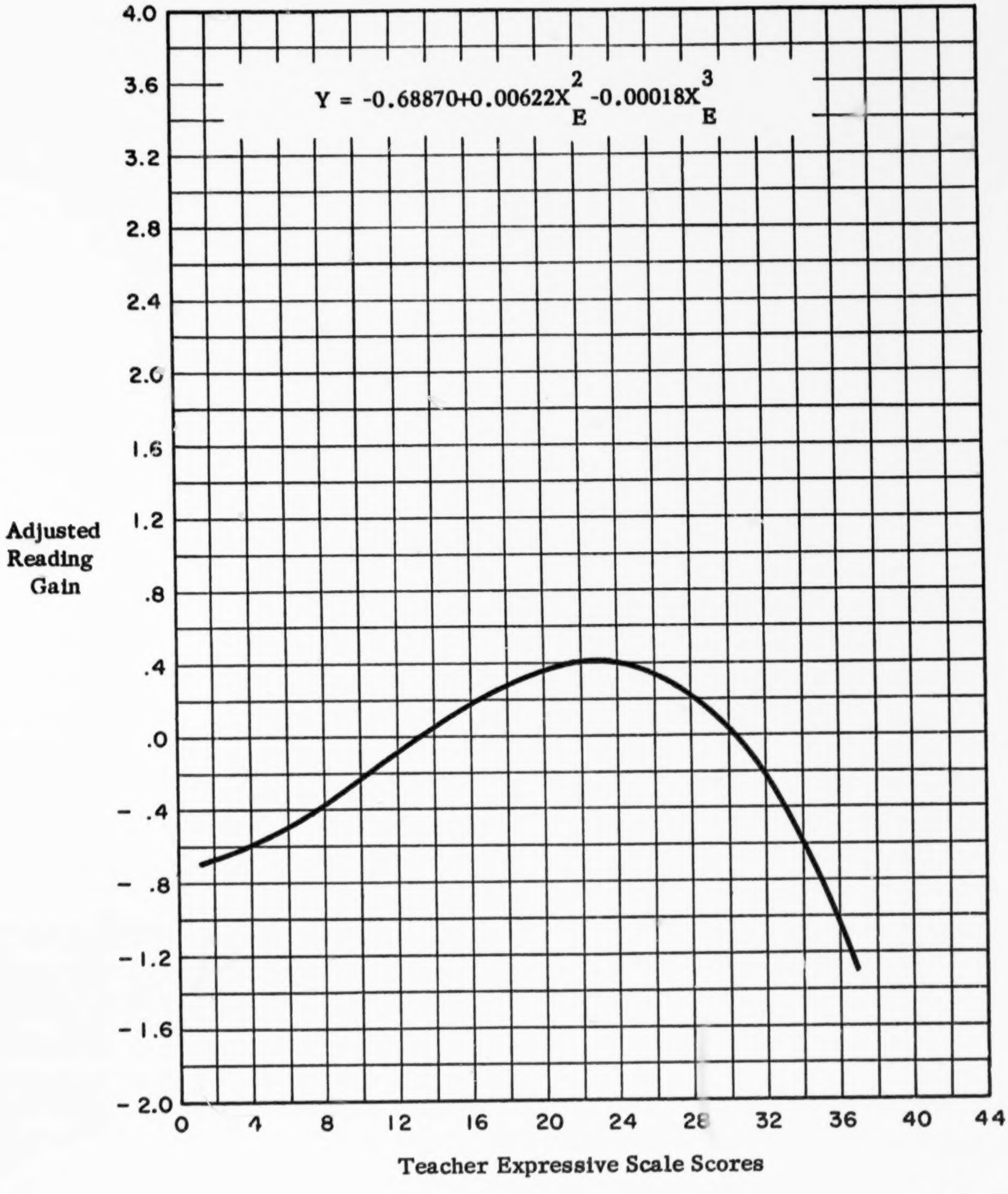


Fig. IV-1. REGRESSION LINE FOR ADJUSTED READING GAIN ON TEACHER EXPRESSIVE SCALE SCORES

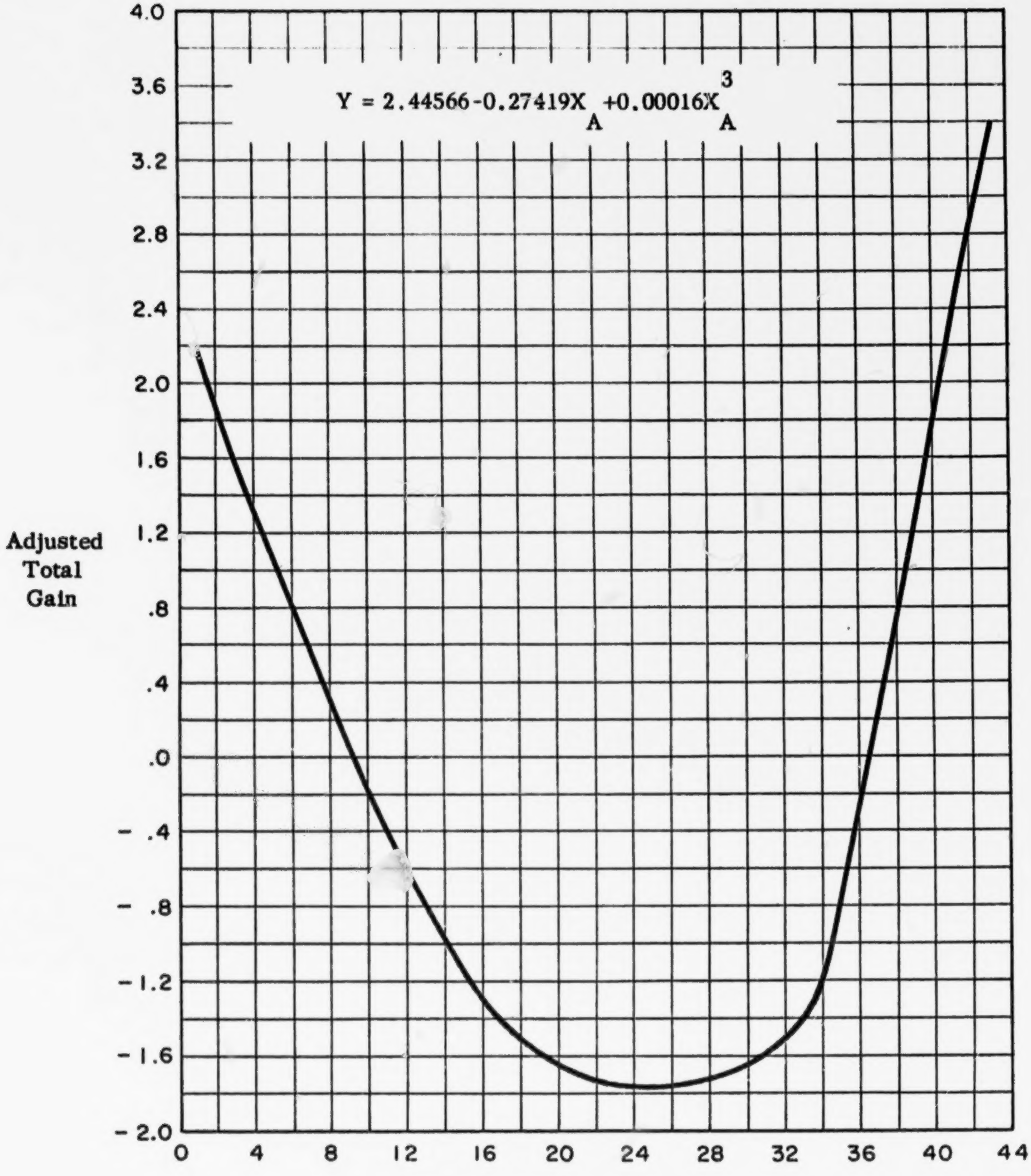


Fig. IV-2. REGRESSION LINE FOR ADJUSTED TOTAL GAIN ON TEACHER AUTHORITY SCALE SCORES

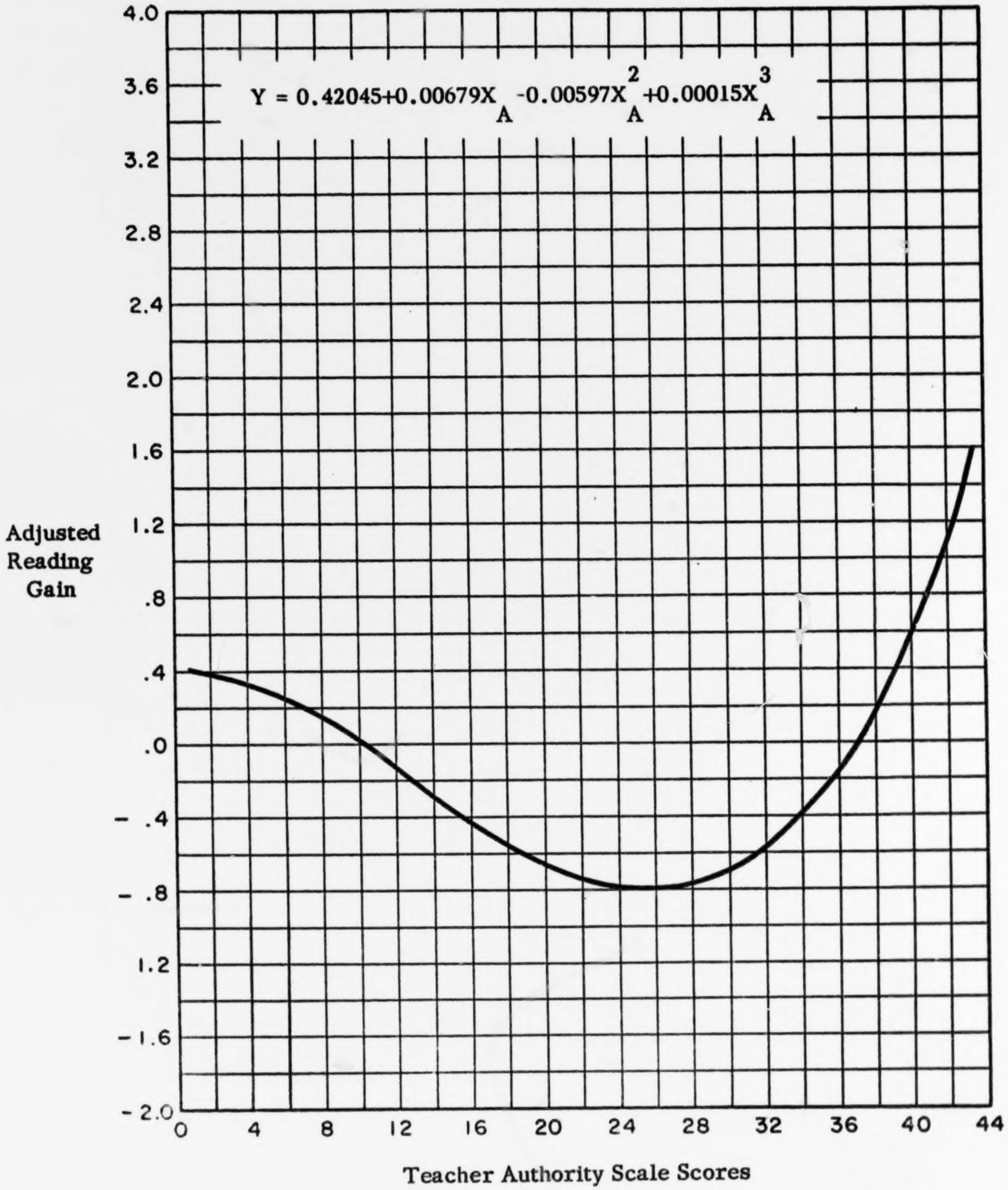
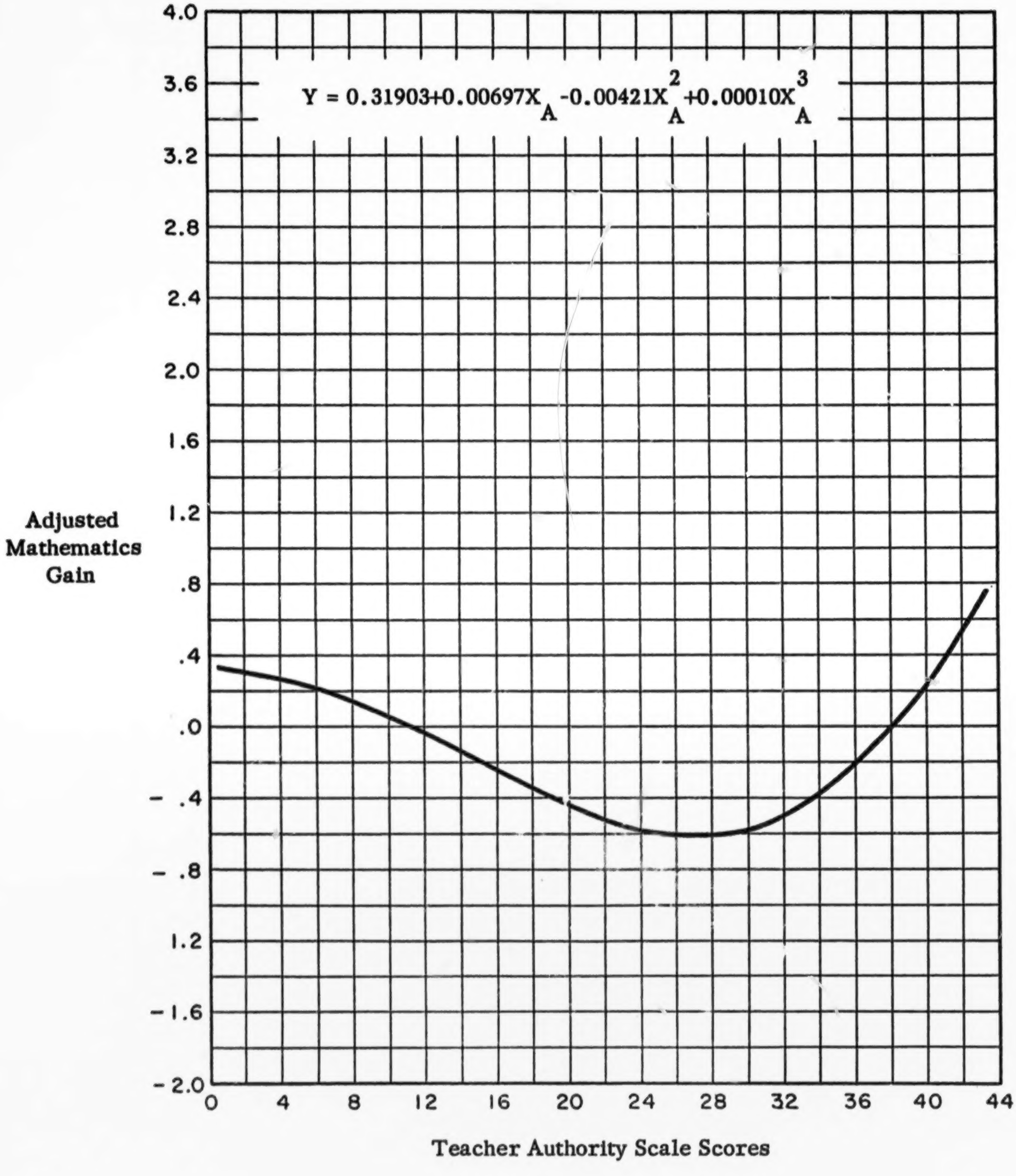


Fig. IV-3. REGRESSION LINE FOR ADJUSTED READING GAIN ON TEACHER AUTHORITY SCALE SCORES



$$Y = 0.31903 + 0.00697X_A - 0.00421X_A^2 + 0.00010X_A^3$$

Fig. IV-4. REGRESSION LINE FOR ADJUSTED MATHEMATICS GAIN ON TEACHER AUTHORITY SCALE SCORES

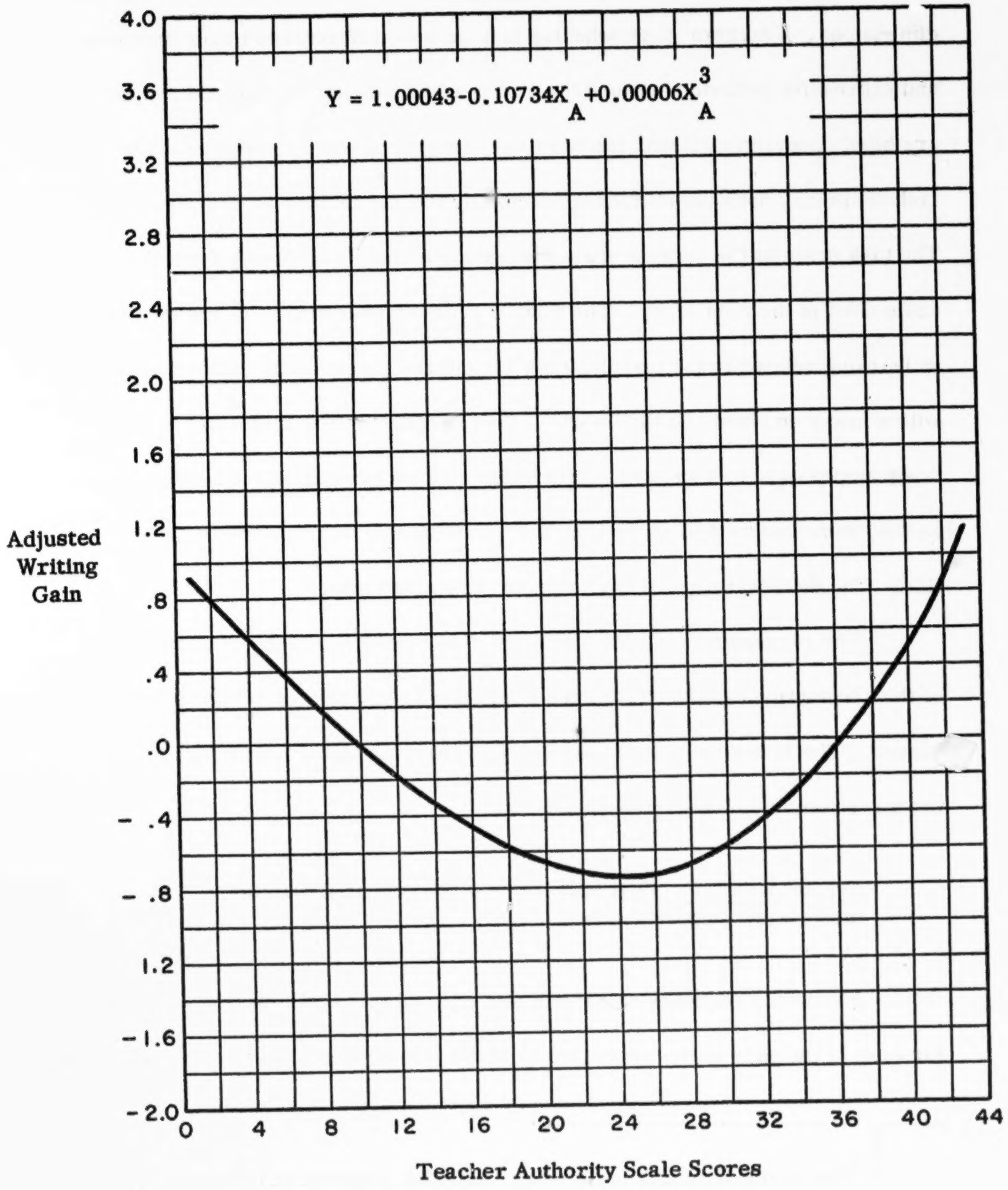


Fig. IV-5. REGRESSION LINE FOR ADJUSTED WRITING GAIN ON TEACHER AUTHORITY SCALE SCORES

possible explanations of the undifferentiated effect of task scores on leadership dimensions. Teachers' task behavior may be less differentiated than authority and expressive behavior because the norms standardizing the cultural system are highly conventional, and teachers vary less on the task dimension. The task scale may not have measured adequately the dimensions as conceptualized. The task scale in the current study represents a shift in emphasis from the scale used in the pilot study. The former scale emphasized more the rituals of learning related to the teaching task, regularity, punctuality, and supervision with a heavy emphasis on the "work". (See Chapter I) The task scale for this study emphasized to a greater extent the principles of programmed instruction as they were understood at the time the questionnaire was constructed. (Table III-8) The net advantage, if any, remains to be explored.

The regression analysis discussed above provided evidence of the status of the assumption of linearity for the prediction of learning gain from leadership scores. The following question arose: Was learning gain a linear function of the three combined leadership dimensions?

> Hypothesis IV-2. Gain will not be a linear function of the three leadership dimensions.

A multiple regression analysis was performed to explore this hypothesis for each of the gain scores on the leadership scale scores.[1] In these regressions, if the leadership scale scores had been found in the above analysis to be significantly curvilinearly related to a given gain score, the leadership scores were transformed according to the expressions above (4.1 to 4.5).

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[1] The residual scores of no effect variables reported in Chapters IV, V, and VI on leadership scores was significantly different from normal when tested by chi-square with three degrees of freedom.

For most of the multiple regression correlations, no improvement in predictive efficiency was obtained by adding the task and expressive dimensions after the inclusion of the polynomial transformation of authority. These stepwise multiple regressions are shown in Tables IV-1 to IV-4.

The regression for adjusted reading gain on leadership scale scores with task linear and authority and expressive transformed (Table IV-1) resulted in a significant correlation of R = .36. The predictive efficiency was obtained from expressive and authority with no significant improvement by the inclusion of the task dimension.

The multiple regression for writing (Table IV-2), resulting in R = .26, was produced by the transformed authority scores with no significant improvement by including the untransformed task scores.

The multiple regression for mathematics, resulting in R = .23, was produced by transformed authority scores with no improvement in predictive efficiency from the addition of the task and expressive scores. (Table IV-3)

A significant multilinear correlation for total gain, R = .29 (Table IV-4), was obtained on transformed authority and task scores; however, again the significant contribution was made by the former.

The regression analyses of the relationship between the leadership dimension and each gain score do not indicate that gain is a linear function of

Table IV-1. STEPWISE MULTIPLE REGRESSION OF ADJUSTED READING GAIN ON LEADERSHIP SCALE SCORES WITH AUTHORITY AND EXPRESSIVE TRANSFORMED

$(Y = -6.97337 + 1.07149X_{PE} + 1.10151X_{PA} + 0.00669X_T)$

Leadership Scores	df	Mean Squares	F
Expressive (transformed)	1	20.59	4.39[b]
Deviation from Regression	72	4.69	
Multiple Correlation Coefficient = .24			
Authority (transformed)	1	24.38	5.52[b]
Due to Regression on X_{PE} and X_{PA}	2	22.48	5.09[c]
Deviation from Regression	71	4.41	
Multiple Correlation Coefficient = .35			
Task	1	.23	0.05
Due to Regression on X_{PE}, $X_{PA,}$ X_T	3	15.06	3.37[d]
Deviation from Regression	70	4.47	
Multiple Correlation Coefficient = .36			

[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{2,70} \geq 4.92) = .01$

[d] $P(F_{3,70} \geq 2.74) = .05$

Table IV-2. STEPWISE MULTIPLE REGRESSION OF ADJUSTED WRITING GAIN ON LEADERSHIP SCALE SCORES, WITH AUTHORITY TRANSFORMED

$(Y = +0.00358+0.96113X_{PA} +0.00729X_{T} +0.00464X_{E})$

Leadership Scores	df	Mean Squares	F
Authority (transformed)	1	19.73	4.94[b]
Deviation from Regression	72	3.99	
Multiple Correlation Coefficient = .25			
Task	1	.50	.12
Due to Regression on X_{PA} and X_{T}	2	10.11	2.50
Deviation from Regression	71	4.04	
Multiple Correlation Coefficient = .26			
Expressive	1	.15	.04
Due to Regression on X_{PA}, X_{T}, X_{E}	3	6.79	1.66
Deviation from Regression	70	4.10	
Multiple Correlation Coefficient = .26			

[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{2,70} \geq 3.13) = .05$

[d] $P(F_{3,70} \geq 2.74) = .05$

Table IV-3. STEPWISE MULTIPLE REGRESSION OF ADJUSTED MATHEMATICS GAIN ON LEADERSHIP SCALE SCORES, WITH AUTHORITY TRANSFORMED

$(Y = +0.30640+0.93495X_{PA} +0.00785X_{E} -0.00505X_{T})$

Leadership Scores	df	Mean Squares	F
Authority (transformed)	1	8.84	3.92
Deviation from Regression	72	2.26	
Multiple Correlation Coefficient = .23			
Expressive	1	.29	.13
Due to Regression on X_{PA}, and X_E	2	4.57	2.00
Deviation from Regression	71	2.28	
Multiple Correlation Coefficient = .23			
Task	1	.11	.05
Due to Regression on X_{PA}, X_E, X_T	3	3.08	1.33
Deviation from Regression	70	2.31	
Multiple Correlation Coefficient = .23			

[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{2,70} \geq 3.13) = .05$

[d] $P(F_{3,70} \geq 2.74) = .05$

Table IV-4. STEPWISE MULTIPLE REGRESSION OF TOTAL ADJUSTED LEARNING GAIN ON LEADERSHIP SCALE SCORES, WITH AUTHORITY TRANSFORMED

$(Y = -0.09981+0.97700X_{PA} +0.03925X_{T} -0.01260X_{E})$

Leadership Scores	df	Mean Squares	F
Authority (transformed)	1	132.53	6.39[b]
Deviation from Regression	72	20.74	
Multiple Correlation Coefficient = .29			
Task	1	5.34	.25
Due to Regression on X_{PA} and X_{T}	2	68.93	3.29
Deviation from Regression	71	20.96	
Multiple Correlation Coefficient = .29			
Expressive	1	1.12	.05
Due to Regression on X_{PA}, X_{T}, X_{E}	3	46.33	2.18
Deviation from Regression	70	21.24	
Multiple Correlation Coefficient = .29			

[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{2,70} - 3.13) = .05$

[d] $P(F_{3,70} - 2.74) = .05$

the three leadership dimensions. These regression equations show transformed authority to be the only dimension significantly related to three gain scores. Reading gain was exceptional in that transformed expressive scores as well as transformed authority scores made a significant contribution to the regression. The finding that the linear regression of the three leadership dimensions was not significant might reflect either that all three dimensions were not necessary to predict gain or that the regression was not linear. The latter alternative fitted the theoretical formulations as expressed in Hypothesis IV-2.

> Hypothesis IV-3. Gain will be a function of the three combined dimensions of teacher leadership with the effect of a given level of performance on any one dimension depending on the level of performance on the other two dimensions.

To examine this hypothesis, which indicates that the effect of leadership behavior on gain would result of interaction among the three dimensions, the modes of teacher leadership were used. Ordinary analysis of variance procedures for testing interaction hypotheses were not employed because of the existence of cells with zero frequencies and also the unequal cell frequencies. Some exploratory regression analysis with terms in two and three variables has been initiated but is not ready for reporting. The concept of teacher leadership modes and the procedure for defining them was discussed in Chpater III. Essentially, the modes are combinations of scale scores of the three leadership dimensions. (Table III-7)

To test whether the differences in the effect of the teacher leadership modes on total gain were significant, a Kruskal-Wallis test of significance of the differences of the means was used. (Table IV-5) This test was made without making any assumption about the nature of the regression of gain on the three dimensions. H = 22.32, for the difference among the 12 modes, was significant at less than .05.

A test of the differences of the effect of teacher mode on the separate areas of gain produced an H for reading approaching .05, but was not significant for writing and mathematics. (Tables IV-6, IV-7, IV-8) When the three tests as independent measures of effect were combined, significance was obtained: Total H = 49.27, significant at .05 with 33 degrees of freedom. To test the tendency of the teacher leadership modes to picture similar effects on pupil gain in the three separate gain scores, a Kendall's correlation of concordance was obtained. A correlation coefficient, W = .87, of the cell means indicated that gain scores on the three areas were correlated significantly at .01. This series of tests provided good evidence of significant difference among modes in their influence on learning gain.

Relationship between a Leadership Dimension and Pupil Effect when Controlling Other Two Dimensions

As there was evidence for the over-all significance of difference among modes, the problem remained to identify whether in actuality all variation was due to the effect of authority or whether interaction obscured the influence of other dimensions in the linear regression analysis. This problem was explored by examining the effect of the variation of a given dimension on gain when the level of the other two dimensions are controlled, using mean scores of leadership

Table IV-5. MEANS FOR ADJUSTED TOTAL ACHIEVEMENT GAIN BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS. (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				-1.18		
		N				17		
	Middle (12-28)	$\bar{X}$	1.86	-6.87	3.60	2.87	-2.48	1.84
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-5.44	-5.20	.79		.96	-.63
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 22.32$; $P(H_{11} \geq 19.68) = .05$

Table IV-6. MEANS FOR ADJUSTED READING GAIN BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS. (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				-.79		
		N				17		
	Middle (12-28)	$\bar{X}$	1.15	-3.02	2.09	1.30	-1.02	.33
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-2.00	-1.74	.97		-.56	-.48
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 19.40$; $P(H_{11} \geq 19.68) = .05$

Table IV-7. MEANS FOR ADJUSTED WRITING GAIN BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				-.31		
		N				17		
	Middle (12-28)	$\bar{X}$	.85	-2.81	.21	.95	-1.04	.82
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-.53	-2.27	0.00		.71	.28
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 16.28$; $P(H_{11} \geq 19.68) = .05$

Table IV-8. MEANS FOR ADJUSTED MATHEMATICS GAIN BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics.)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				-.11		
		N				17		
	Middle (12-28)	$\bar{X}$	-0.08	-0.52	1.89	.54	-.76	.62
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-1.98	-1.34	-.34		.70	-.37
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 13.59$; $P(H_{11} \geq 19.68) = .05$

modes for making these comparisons. The specific question was to determine whether or not the regression of gain on a given dimension remained the same regardless of the levels of the other two dimensions. It will be recalled that the regression of gain on the dimensions were in general (4.1 to 4.5):

Linear positive on task scores;

Curvilinear on authority scores with middle authority low;

Curvilinear on expressive scores with middle expressive high.

Task and total gain with authority and expressive controlled. The degree of control present when both high task-orientation and high authority are combined appeared to have a negative effect on gain with both low and middle expressive scores. The absence of cases in modes involving high expressive scores with high authority scores makes it impossible to observe the effect of that combination.

Comparing the cells of the "low task" segment of Table IV-5 with the parallel cells of the "middle and high task" segment, we see that means for the former are lower in every instance except the two pairs of cells in which high authority is operating.

Effect of task on reading, writing, and mathematics gain with authority and expressive controlled. Tables IV-6, IV-7, and IV-8 are similar to those for total gain. (Table IV-5) The relationship with reading is identical. Writing and task are negatively related only when high authority is combined with low expressive. Mathematics gain and task are related in a manner similar to total gain except that middle expressive combined with middle authority produces a negative relationship between task and gain. This means that task and gain tend to be most often positively related to gain for writing and most often negatively related to gain for mathematics.

Effect of authority on total gain with task and expressive controlled. The non-linear relationship of authority to total gain observed previously with the multiple correlation also holds when the task and expressive dimensions are controlled, as can be observed by comparing three-celled rows in Table IV-5. Among the four possible comparisons, the two with middle expressive scores are curvilinear regardless of task level, with middle authority the poorest. However, high authority is best with low task while low authority is best with middle and high task. As noted above, the combination of high authority with high task appears to involve a degree of control negative to gain.

The shift in direction of the effect on gain appears to be a function of the degree and nature of the control over learning produced by the teacher's use of various combinations of task and authority with the expressive functioning to modify the impact of the other two dimensions.

Comparisons among modes for which expressive scores were low and for which gain scores tended also to be poorer revealed that the curvilinear regression predicted from the total group of teachers did not appear. Instead authority was found to be related positively to gain when task-orientation was low but related negatively to gain with greater emphasis on the learning task.

Effect of authority on reading, writing, and mathematics gain with task and expressive controlled. The effect of authority on reading, writing, and mathematics gain when the task and expressive dimensions are controlled may be observed in Tables IV-6, IV-7, and IV-8.

The curvilinear relationship between authority and total gain for middle expressive scores held for each separate gain score. It holds also for low expressive with low task for writing gain, contrary to the findings for the total gain scores. In reading gain the relationship between authority and gain remained positive for low-expressive modes regardless of task level.

Expressive and total gain with task and authority controlled. The effect of expressive behavior on total gain was generally positive, but the curvilinear tendency observed for the regression was also apparent when the task and authority dimensions were controlled. This can be observed by comparing the columns of Table IV-5. Three of the five comparisons between low and middle expressive levels indicated higher gain for the latter. Negative relationships occur with middle authority for both levels of task and with high task and low authority. The absence of modes involving high expressive prevented the observation of other moderate and high expressive comparisons. Generally the influence of the expressive dimension appears to be positive with middle better than high. The function of expressive modifies the effects of task and authority. Generally, it moderates the over-control of too much task and authority, but it appears to reduce also some of the essential tension when adequate levels of task and authority are present.

Expressive and reading, writing, and mathematics gain with task and authority controlled. The influence of the expressive dimension on reading, writing, and mathematics gain with the task and authority dimensions controlled is with only one exception the same as that observed for total gain. (Tables IV-6, IV-7, and

IV-8) This exception is the relationship between expressive on mathematics gain for low task and middle authority, which is positive.

CHAPTER V

RELATIONSHIP OF TEACHER LEADERSHIP TO PUPIL MORALE

Pupil satisfaction was conceived as one of the most responsive indicators of the effect of the teacher's classroom behavior on pupils. Pupil morale was defined as the degree of satisfaction expressed regarding school, work, peer, and teacher. Observations of pupil morale were made in both the fall and spring as described in Chapter II. It was assumed that the teacher was the most significant source of morale, and his performance on the three dimensions of leadership would account for a large measure of the variations in pupil morale by classroom.

It was assumed that classrooms would be relatively undifferentiated with respect to morale at the opening of school, but highly differentiated by spring. However, since the fall morale measures were taken after the pupils had been in contact with the teacher for a month, it was expected that a substantial trend in morale, particularly teacher morale, would be evident by the time of the fall measurement.

Relationship of Teacher Leadership to Morale

The relationship between the dimensions of teacher leadership and pupil morale were predicted according to the following hypothesis.

> Hypothesis V-1. High scores on the task and expressive dimensions and low scores on the authority dimension will be favorable to each of the specific types of morale as well

> as to general morale. This hypothesis indicates that the degree of specialization of task, authority, or expressive behavior will produce different degrees of morale of the various types, e.g., task behavior should produce work morale, expressive should produce teacher morale, authority should produce a negative effect on school and teacher morale.

The zero-order correlation coefficients indicate that all three dimensions of leadership were related to pupil morale in the predicted direction. (Table V-1) Twenty-five of the 30 correlation coefficients were significant at five percent or better. As expected, the coefficients were higher for spring than for fall and higher for pupil morale in relation to the teacher than for any of the other measures. Next in order were school and work morale with peer morale low and not significant.

All three leadership dimensions were significantly related to both general morale scores and were more significantly related to the spring general morale. The correlation coefficients for the expressive dimension were markedly higher for most of the morale measures than were those of the task and expressive dimensions, which were of about equal value but opposite in direction.

Neither the teacher's assigned work volume scores for fall nor for spring were significantly related to the sets of fall and spring morale scores. The one exception was the correlation of .26 between fall assigned work volume and fall work morale. Nevertheless, the direction of the relationships between assignment volume scores and morale scores exhibited a consistent pattern. It appeared to indicate that teachers with high assignment volumes in the fall

Table V-1. ZERO-ORDER CORRELATIONS BETWEEN TEACHER LEADERSHIP SCALE SCORES AND PUPIL MORALE SCORES

	Pupil Morale									
	Fall Pupil Morale					Spring Pupil Morale				
Leadership Scores	School	Work	Peer	Teacher	General	School	Work	Peer	Teacher	General
Task	+.21	+.27^b	+.10	+.44^b	.20	+.40	+.07	+.13	+.50^b	.33
Authority	-.26	.03	.04	-.33	-.18	-.28	-.15	.02	-.48	-.34
Expressive	.41^a	.26	.11	.63^a	.40^a	.54^a	.29^b	.09	.80^a	.62^a
Fall Assignment Volume	.06	.26^d	.13	.16	.09	.10	.12	-.02	.10	.08
Spring Assignment Volume	-.09	.04	-.17	.03	-.12	-.20	-.19	-.14	.01	-.17
Fall-Spring Assignment Volume Difference	-.14	-.24^d	-.28^d	-.14	-.20	-.27^d	-.30^c	-.10	-.10	-.23^d

[a] $P(r_{74} = .15) = .01$ (one-tailed test)

[b] $P(r_{74} = .11) = .05$ (one-tailed test)

[c] $P(r_{74} = .29) = .01$ (two-tailed test)

[d] $P(r_{74} = .22) = .05$ (two-tailed test)

have a positive effect on morale both fall and spring, while teachers with high assignment volume in the spring have a negative effect on morale both fall and spring.

Among the three volume measures the fall-spring difference in assignment volume produced the highest correlation coefficients, half of them significant, and all negative. Change in volume was shown in Chapter III to represent largely reduction in volume.

The question of the relationship among the pupil morale measures has been largely answered by the fact that the four fall as well as the four spring morale scores produced the fall and spring general morale scales with highly satisfactory coefficients of reproducibility.

A further indication of the relationship among the pupil morale measures was the level of the zero-order intercorrelations of the morale scores discussed earlier. (Table V-2) These correlation coefficients show that most of them are significantly related. While generally they tend to be highly related in a positive direction, they range from .06 between spring teacher and spring peer morale scores to .68 between spring teacher and spring school morale. A coefficient of concordance based on these correlation coefficients significant at one percent was obtained with the following:

Fall Morale	W = .61
Spring Morale	W = .55

These data support two basic assumptions that have been held throughout the study about pupil morale. First, through teacher influence pupil morale is

Table V-2. ZERO-ORDER INTERCORRELATIONS OF THE FOUR FALL AND SPRING PUPIL MORALE SCORES AND THE FALL AND SPRING GENERAL PUPIL MORALE SCORES

		Pupil Morale									
		Fall					Spring				
		School	Work	Peer	Teacher	General	School	Work	Peer	Teacher	General
Pupil Morale											
Fall	School										
	Work	.62									
	Peer	.53	.47								
	Teacher	.56	.39	.34							
	General	.89	.60	.62	.63						
Spring	School	.46	.54	.31	.55	.49					
	Work	.37	.49	.22	.30	.38	.58				
	Peer	.42	.37	.47	.13	.42	.35	.30			
	Teacher	.35	.28	.07	.67	.37	.68	.43	.06		
	General	.52	.48	.27	.58	.52	.89	.67	.40	.74	

derived in different degree from several foci of the school system, from school as a place, from school work, from peer relationships, and from the teacher. This means that the leadership behavior of the teacher results in variation from these sources. In this sense, morale is multi-dimensional, and there will be some specialization of the morale effect depending on the level of the teacher's performance on the three leadership dimensions. This problem will be considered further later with the analysis of pupil morale in relation to teacher leadership modes.

The second assumption regarding the nature of pupil morale is that, although it may be regarded as a composite of specialized effects, it tends to generalize so that the possibility of a general morale scale is not incompatible with some specialization. The evidence so far tends to support both assumptions. It would appear that the effort to view morale as a somewhat differentiated effect is justified.

Hypothesis V-1 predicted the linear relationship of each of the leadership dimensions to morale. It was also predicted that some or most of the regressions would show some non-linear tendencies. It was expected that the increasing use of task behavior would level off in its effect on morale or decline, that the increasing use of expressive behavior would have an increasingly positive effect, and that an increase in the use of authority would have an increasingly negative influence on morale.

To explore the actual relationships of the leadership scores to the morale scores, these relationships were tested with regressions of each of the morale scores on logarithmic and polynomial transformations of the leadership scale scores.

Of the 30 regressions produced from each of the morale scores on each of the separate leadership dimensions, only six differed significantly from the linear regressions; one was on the task leadership scale scores; one was on the authority scores; four were on the expressive scores.

The regression of spring school morale on task scores indicated that the favorable effect of increase in task scores leveled off and declined sharply with the highest task scores:

$$Y = 12.00871+2.17416X_T-0.00159X_T^3 \tag{5.1}$$

The regression of spring teacher morale on authority scores was curvilinear with low scores favorable and middle scores most unfavorable. High scores were increasingly favorable (leveling off in effect with the highest scores):

$$Y = 49.19052-0.29680X_A^2+0.00440X_A^3+4.39949X_A \tag{5.2}$$

The other four regressions of morale scores that differed significantly from linear were on the expressive scores. These regressions were all curvilinear with high expressive scores increasingly favorable to morale, as follows:

Fall school morale on expressive scores

$$Y = 25.45381+0.01579X_E^2 \tag{5.3}$$

Fall work morale on expressive scores

$$Y = 19.25092+0.01643X_E^2+0.00022X_E^3 \qquad (5.4)$$

Spring work morale on expressive scores

$$Y = 34.63951+0.62483X_E^2 \qquad (5.5)$$

Spring general morale on expressive scores

$$Y = 20.83837+0.06132X_E^2 \qquad (5.6)$$

Although only the six regressions were significantly different from linear, they reflect the tendencies of the rest, which did not differ significantly from linear. In summary, these tendencies as expressed in the above regressions were as follows: an increase in the use of expressive behavior tends to be increasingly favorable to morale; the favorable effect on morale from an increase in the use of task behavior tends to level off or decline; the unfavorable effect of an increase in the use of authority tends to level off.

Pupil Morale as a Multilinear Function of the Three Leadership Dimensions

With some indication of how the separate dimensions of teacher leadership were related to pupil morale, the question as to whether morale is a multilinear function of the three dimensions was examined. Multiple regressions were obtained for each of the morale scores for both fall and spring on the three combined teacher leadership dimensions. These regressions are shown in Tables V-3 to V-12. Leadership dimensions were untransformed except for the six found to differ significantly from linear.

Table V-3. MULTIPLE REGRESSION ANALYSIS OF FALL PUPIL SCHOOL MORALE ON TEACHER LEADERSHIP SCALE SCORES

$(Y = 3.19790 + 0.88060X_{PE} + 0.13276X_{T} - 0.06040X_{A})$

Leadership Scores	df	Mean Squares	F
Expressive (transformed)	1	3881.34	14.43[a]
Task	1	63.62	.23
Authority	1	25.75	.09
Due to Regression	3	1295.30	4.68[c]
Deviation from Regression	70	275.30	

Multiple Correlation Coefficient = .41

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[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3,70} \geq 4.08) = .01$

Table V-4. MULTIPLE REGRESSION ANALYSIS OF FALL PUPIL WORK MORALE ON TEACHER LEADERSHIP SCALE SCORES

$(Y = 16.28613+0.84911X_{PE}+0.28461X_{T}+0.06628X_{A})$

Leadership Scores	df	Mean Squares	F
Expressive (transformed)	1	3054.53	11.99[a]
Task	1	323.00	1.27
Authority	1	47.89	0.19
Due to Regression	3	1141.80	4.45[c]
Deviation from Regression	70	256.80	

Multiple Correlation Coefficient = .40

---

[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3,70} \geq 4.08) = .01$

Table V-5. MULTIPLE REGRESSION ANALYSIS OF FALL PUPIL PEER MORALE SCORES ON TEACHER LEADERSHIP SCALE SCORES

$$(Y = 28.93631+0.31274X_E +0.23248X_A +0.05656X_T)$$

Leadership Scores	df	Mean Squares	F
Expressive	1	255.03	.82
Authority	1	399.96	1.29
Task	1	12.71	.04
Due to Regression	3	222.57	.71
Deviation from Regression	70	314.03	

Multiple Correlation Coefficient = .17

---

[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3,70} \geq 2.74) = .05$

Table V-6. MULTIPLE REGRESSION ANALYSIS OF FALL PUPIL TEACHER MORALE SCORES ON TEACHER LEADERSHIP SCALE SCORES

$$(Y = 21.18116+1.14682X_E +0.50163X_T +0.09342X_A)$$

Leadership Scores	df	Mean Squares	F
Expressive	1	13,780.79	48.33[a]
Task	1	1,179.58	4.33[b]
Authority	1	55.85	.20
Due to Regression	3	5,005.41	18.16[c]
Deviation from Regression	70	275.59	

Multiple Correlation Coefficient = .66

---

[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3.70} \geq 4.08) = .01$

Table V-7. MULTIPLE REGRESSION ANALYSIS OF SPRING PUPIL SCHOOL MORALE ON TEACHER LEADERSHIP SCALE SCORES

$(Y = +8.20906 + 0.79459X_E + 0.20597X_{PT} + 0.04779X_A)$

Leadership Scores	df	Mean Squares	F
Expressive	1	7280.08	29.36[a]
Task (transformed)	1	860.12	3.59
Authority	1	14.62	.06
Due to Regression	3	2718.27	11.21[c]
Deviation from Regression	70	242.52	

Multiple Correlation Coefficient = .57

[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3,70} \geq 4.08) = .01$

Table V-8. MULTIPLE REGRESSION ANALYSIS OF SPRING PUPIL WORK MORALE ON TEACHER LEADERSHIP SCALE SCORES

$(Y = 2.99256 + 0.531[illegible]3X_{PE} - 0.13585X_{T} + 0.08488X_{A}$

Leadership Scores	df	Mean Squares	F
Expressive (transformed)	1	1846.76	7.47[a]
Task	1	61.47	.25
Authority	1	50.86	.20
Due to Regression	3	653.03	2.58
Deviation from Regression	70	252.77	

Multiple Correlation Coefficient = .32

[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3,70} \geq 2.74) = .05$

Table V-9. MULTIPLE REGRESSION ANALYSIS OF SPRING PUPIL PEER MORALE SCORES ON TEACHER LEADERSHIP SCALE SCORES

$$(Y = 27.15901 + 0.16846X_T + 0.18180X_E + 0.14536X_A)$$

Leadership Scores	df	Mean Squares	F
Task	1	324.25	1.20
Expressive	1	31.11	.11
Authority	1	135.22	.49
Due to Regression	3	163.51	.60
Deviation from Regression	70	274.73	.52

Multiple Correlation Coefficient = .16

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[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3,70} \geq 2.74) = .05$

Table V-10. MULTIPLE REGRESSION ANALYSIS OF SPRING PUPIL TEACHER MORALE ON TEACHER LEADERSHIP SCALE SCORES

$$(Y = -3.27670 + 1.53267X_E + 0.70473X_T + 0.26014X_{PA})$$

Leadership Scores	df	Mean Squares	F
Expressive	1	33532.20	127.51[a]
Task	1	1499.87	5.74[b]
Authority (transformed)	1	637.21	2.49
Due to Regression	3	12556.43	40.02[c]
Deviation from Regression	70	256.11	

Multiple Correlation Coefficient = .82

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[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3,70} \geq 4.08) = .01$

Table V-11. MULTIPLE REGRESSION ANALYSIS OF FALL GENERAL MORALE SCORES ON TEACHER LEADERSHIP SCALE SCORES

$(Y = +6.75387+1.90442X_E +0.41351X_A)$

Leadership Scores	df	Mean Squares	F
Expressive	1	23,028.41	13.96[a]
Authority	1	1,158.43	.70
Task			[d]
Due to Regression	2	12,093.42	7.30[c]
Deviation from Regression	71	1,656.50	

Multiple Correlation Coefficient = .41

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[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{2,70} \geq 4.92) = .01$

[d] F ratio for partial correlation on Y is less than .01.

Table V-12. MULTIPLE REGRESSION ANALYSIS OF SPRING GENERAL MORALE ON TEACHER LEADERSHIP SCALE SCORES

$(Y = -7.56878 + 0.96905X_{PE} + 0.49122X_{T} + 0.10349X_{A})$

Leadership Scores	df	Mean Squares	F
Expressive (transformed)	1	58501.35	49.84[a]
Task	1	1160.83	.99
Authority	1	75.60	.06
Due to Regression	3	19912.60	16.73[c]
Deviation from Regression	70	1189.74	

Multiple Correlation Coefficient = .65

---

[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3,70} \geq 4.08) = .01$

The interrelationship among the different types of pupil morale was indicated, for the 74 teachers, to be one of significantly high intercorrelation. (Table V-2) The question follows as to whether the relationship among types of morale holds also for the 12 teacher leadership modes. Ranking of the mean fall pupil morale scores by teacher modes (Tables V-15 to V-18) and the parallel scores for spring on teacher modes (Tables V-19 to V-22) indicate that the teacher leadership modes produce about the same relative effect for different types of morale.

The multiple correlation coefficients for the ten regressions of morale on the three leadership dimensions were all significant with the following three exceptions: fall and spring peer morale (Tables V-5 and V-9) and spring work morale (Table V-8). All of the multiple regressions indicated that generally the expressive dimension, under the assumption of linearity, was the major determinant of all types of morale, including general morale. With the exception of peer morale, the expressive scores were significantly related to all morale measures. There was a significant improvement with the inclusion of the task scores for fall and spring teacher morale, but the addition of the authority scores did not result in any improvement in predictive efficiency. This probably can be explained by the high negative correlation between the authority and expressive dimensions. Authority has a high negative relation to the expressive dimension.

Although the regressions of the various pupil morale measures generally produced significant multiple correlation coefficients, the absence of a significant contribution of task for some and authority for all of the measures indicated that the effect of these two dimensions might be obscured by interaction among the dimensions. To take account of the nature of the effect of all three leadership dimensions on pupil morale, the following interactional hypothesis was tested.

> Hypothesis V-2. Morale will be a function of the three combined dimensions of teacher leadership with the effect of a given level of performance on any one dimension, depending on the level of performance on the other two dimensions.

To test this hypothesis, the teacher leadership modes that were formed for total pupil learning gain were related to mean pupil morale scores by modes. The modes for total gain were accepted after exploring alternative leadership scale combinations to determine whether a more efficient predictive combination could be obtained; none was found.

To test whether or not differences in the effect of teacher leadership modes on pupil morale were significant, Kruskal-Wallis tests of the significance of the differences of mean pupil morale by teacher leadership modes were made for each morale measure. (Tables V-13 to V-22) The following list summarizes the results of this test:

	Values of H	
Pupil Morale	Fall	Spring
General	17.84	26.77[b]
Teacher	33.61[a]	46.87[a]
School	16.19	24.47[c]
Work	18.51	11.45
Peer	13.11	10.18

[a] Significant at .001 level

[b] Significant at .01 level

[c] Significant at .02 level

Table V-13. MEANS FOR FALL GENERAL PUPIL MORALE BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				75		
		N				17		
	Middle (12-28)	$\bar{X}$	33	56	115	55	33	72
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	1	15	16		24	40
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 18.17$; $P(H_{11} \geq 19.68) = .05$

Table V-14. MEANS FOR SPRING GENERAL PUPIL MORALE BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				93		
		N				17		
	Middle (12-28)	$\bar{X}$	34	97	53	64	32	36
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	1	24	8		27	47
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 27.00$; $P(H_{11} \geq 24.72) = .01$

Table V-15. MEANS FOR FALL PUPIL TEACHER MORALE BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics.)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				16.94		
		N				17		
	Middle (12-28)	$\bar{X}$	-10.33	- 3.00	2.00	9.64	- 7.18	4.38
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-49.00	-21.25	-35.00		-18.00	-6.80
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 33.61$; $P(H_{11} \geq 31.26) = .001$

Positive scores indicate higher morale (and lower scores, lower morale) than the total group of 74 teachers.

Table V-16. MEANS FOR FALL PUPIL SCHOOL MORALE BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics.)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				9.94		
		N				17		
	Middle (12-28)	$\bar{X}$	- 4.17	1.00	8.00	1.36	- 9.73	3.13
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-33.00	-11.25	-14.67		-14.50	-4.00
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 16.19$; $P(H_{11} \geq 19.68) = .05$

Table V-17. MEANS FOR FALL PUPIL WORK MORALE BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics.)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				9.06		
		N				17		
	Middle (12-28)	$\bar{X}$	-12.50	-14.00	-12.00	-4.00	-4.00	10.38
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-32.00	-11.25	2.00		0.00	3.40
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 18.51$; $P(H_{11} \geq 19.68) = .05$

Table V-18. MEANS FOR FALL PUPIL PEER MORALE BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics.)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				0.04		
		N				17		
	Middle (12-28)	$\bar{X}$	- 7.00	-5.00	23.00	0.93	-2.55	8.75
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-15.00	-5.25	-11.67		17.00	-6.20
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 13.11$; $P(H_{11} \geq 19.68) = .05$

Table V-19. MEANS FOR SPRING PUPIL TEACHER MORALE BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics.)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				29.18		
		N				17		
	Middle (12-28)	$\bar{X}$	- 9.00	19.5	-23.00	12.93	-12.55	13.38
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-30.00	-35.75	-41.67		-27.5	-7.2
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 46.87$; $P(H_{11} \geq 31.26) = .001$

Table V-20. MEANS FOR SPRING PUPIL SCHOOL MORALE BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics.)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				13.18		
		N				17		
	Middle (12-28)	$\bar{X}$	-15.00	3.5	- 9.00	5.50	-5.55	3.38
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-13.00	-21.00	-21.00		0.00	-1.60
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 24.47$; $P(H_{11} \geq 22.62) = .02$

Table V-21. MEANS FOR SPRING PUPIL WORK MORALE BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics.)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				6.35		
		N				17		
	Moderate (12-28)	$\bar{X}$	3.83	14.0	15.00	2.36	-7.18	0.88
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-26.00	-4.25	-5.00		1.00	-0.80
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 11.45$; $P(H_{11} \geq 19.68) = .05$

Table V-22. MEANS FOR SPRING PUPIL PEER MORALE BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics.)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				5.53		
		N				17		
	Middle (12-28)	$\bar{X}$	-10.67	-3.5	20.00	0.50	-1.36	1.63
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-16.00	-2.75	4.33		12.5	2.0
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 10.18$; $P(H_{11} \geq 19.68) = .05$

This summary indicates that the teacher leadership modes that predicted total learning gain also were able to significantly predict spring general morale, fall and spring teacher morale, and spring school morale. Fall work morale approached significance. Clearly, teacher morale was the morale dimension most significantly related to teacher leadership mode and the dominant influence on general morale.

It was expected that morale difference by teacher modes would be greater in spring than fall for all morale measures, but work and peer differed more in the fall. Apparently the "dead level" effect regarding work that all teachers produce reduced the differences in work morale by spring.

To answer the question as to whether teacher modes had a similar effect on different types of morale, a correlation of the fall and spring sets of rankings of the morale measures was obtained. A coefficient of concordance significant at one percent was obtained for each of the sets of rankings of means of the specific morale scores as follows: four fall morale measures $W = .66$; four spring measures $W = .67$. This indicates that the modes tended to effect different types of morale similarly.

Relationship between a Leadership Dimension and Pupil Morale when Controlling Other Two Dimensions

With evidence for the over-all significance of difference of mean pupil morale among teacher modes, as well as evidence of the degree of similarity of the effect on different types of morale, the problem remained to identify whether in actuality all variation was due to the teacher expressive behavior or expressive and task behavior for some morale measures, or whether the effects of teacher performance on the task and authority dimensions might be obscured by interaction effects, as was indicated for learning gain. Tables V-13 through V-22 may be examined to determine whether or not the regression of morale on a given dimension remained the same regardless of the levels of the other two dimensions.

It was noted that the regression of morale on the leadership dimensions was in general positive for task and expressive and negative for authority.

Relationship of the task dimension to pupil morale with authority and expressive dimensions controlled. Middle and high task modes with low expressive scores had higher general pupil morale than low task modes with both moderate and high authority. (Tables V-13 and V-15) The opposite holds for the same combinations with middle expressive. For middle expressive modes using low authority, middle to high task effected higher morale than does low task. The same pattern was found for both fall and spring general morale.

The increase in pupil satisfaction from higher task behavior with low expressive, but not with middle expressive, was an increase from a base of general pupil satisfaction lower than that of the middle expressive modes. Among the low expressive modes the preponderance of satisfaction is provided by the middle and high task side. On the low task side the middle expressive modes are the locus of the high satisfaction base. The mode with low authority is an exception with high satisfaction on the high task side.

For specific types of morale the relationship to task behavior was the same for fall school and fall peer as for fall and spring general morale. (Tables V-16 and V-18) Middle and high task had higher fall work morale than low task for all modes except the one with middle expressive and high authority. (Table V-17)

For both fall and spring teacher morale and spring work morale, middle and high task had higher morale scores than low task for all modes except the one with middle expressive and middle authority. (Tables V-15, V-19, and V-21)

Modes with low expressive, whatever the combination with authority, show higher spring work morale at middle and high levels of task; low task is higher with middle expressive. Spring peer morale is higher with low task for modes with high authority at both low and middle expressive. (Table V-22) All other modes are better with middle and high task.

Relationship of the authority dimension to pupil morale with task and expressive dimensions controlled. Contrary to the expectation established by the zero-order correlation, the relationship of authority to fall general morale was generally positive when the expressive and task dimensions were controlled. For every comparison possible, the highest level of authority produced higher morale than did the lowest. Only for middle-to-high task and middle expressive modes was middle authority less conducive to morale than low authority. The low negative correlation between authority and morale was produced by the substantial negative correlation between expressive and authority behavior. (Table V-13)

For spring general morale the effect of authority was very different. For low task modes middle authority effected higher morale; for middle and high task modes middle authority effected lower morale. (Table V-14) None of the three level comparisons shows the highest level of authority to be the most effective inducement to high morale. Clearly, the morale function of authority depends on its combinations with given levels of the other two dimensions of leadership.

None of the other fall morale measures was related to authority in the exact pattern of fall general morale, although generally high authority effected higher morale than does low authority. For fall teacher morale two modes were curvilinear, and for all but one mode high authority effected higher morale than low authority. Low authority with middle expressive and middle and high task effected higher morale than high authority.

Fall school morale has two curvilinear modes, but for all modes high authority effected higher morale than low authority. (Table V-16) Only one mode for fall work morale varies from linear; also for all modes high authority effected higher morale than low authority. (Table V-17) High authority effected higher morale than low authority for fall peer morale with curvilinear tendencies for two modes. (Table V-18)

The two major tendencies for the relationship of authority to spring general morale to be curvilinear with middle authority lowest and low authority effecting higher morale were reflected also in the specific spring morale relationships. (Tables V-19 to V-22)

Relationship of the expressive dimension to pupil morale with the task and authority dimensions controlled. The effect of the expressive dimension with task and authority was consistent with the regression described above. Both fall and spring general pupil morale were positive for all teacher leadership modes except spring general morale; low expressive with high authority and middle and high task effected higher morale than low expressive. (Tables V-13 and V-14)

The specific types of pupil morale for fall largely followed the pattern for fall general morale; teacher and school were identical and were positive for all modes. (Tables V-15 and V-16)

Least like fall general morale were fall work and fall peer. (Tables V-17 and V-18) For three of the six modes, the lower level of expressive behavior effected higher work morale. Fall peer morale with two exceptions was generally higher with the higher level of expressive.

Spring pupil teacher morale was similar to spring general; all relationships were positive. (Table V-19) Spring work was also the same with one exception -- low expressive effected higher morale with middle authority and middle and high task than middle expressive. (Table V-21)

Two exceptions to the all linear positive pattern of general morale were obtained for spring school morale. Low expressive effected higher morale with middle authority and middle and high task than did middle expressive. Low expressive also effected higher morale with low authority and low task.

Spring peer morale was least like the spring general morale pattern. Three of the low expressive modes effected higher morale than that morale effected at higher expressive modes. (Table V-22)

CHAPTER VI

TEACHER LEADERSHIP AND PUPIL COMPLIANCE

School cultures abound in regulations and rules which define expected pupil behavior. Further definitions of expected behavior are carried in the folklore of incidents of rule violations as recalled by both pupils and educators. The traditional interest in pupil compliance has been based on the assumption that involvement in school activity and acceptance of the demands for classroom order are related to increase in pupil's knowledge and his conformity to social norms. Interest in pupil compliance in this study was related to the assumption that pupil involvement in activity results in observable effects on pupils and that the degree of involvement is a function of the teacher's leadership as defined. Essentially, pupil compliance as used here means the degree to which pupils conform to patterns of assigned work, engage in volunteer work, and meet the expectations for classroom order. The measurement of these compliance variables was described in Chapter II.

Relationship of Teacher Leadership Dimensions to Pupil Compliance with Assigned Work

> Hypothesis VI-1. The task and expressive dimensions of teacher leadership are positively related to pupil compliance to assigned work in both fall and spring. Authority is positively related to compliance in the fall and negatively related in the spring.

The zero-order correlations between teacher leadership dimensions and pupil fall and spring compliance indicate the relationships to be generally as

Table VI-1. ZERO-ORDER CORRELATIONS BETWEEN TEACHER LEADERSHIP SCALE SCORES AND SCORES MEASURING PUPIL COMPLIANCE WITH ASSIGNED WORK

Leadership Scores	Pupil Compliance with Assigned Work		
	Fall	Spring	Fall-Spring Difference
Task	$.18^a$	$.24^a$	.06
Authority	.06	$-.13^b$	$-.20^a$
Expressive	$.15^a$	$.18^a$	.10

[a] $p(r_{74} = .15) = .01$ (one-tailed test)

[b] $p(r_{74} = .11) = .05$ (one-tailed test)

expected. (Table VI-1) Five of the six correlation coefficients were significant at five percent, with the highest relationship between the task dimension and pupil compliance, and the lowest with authority. Also, the coefficients for all three of the dimensions with pupil compliance were higher for spring than fall. As predicted, the direction in the relationship of authority with pupil compliance was positive for fall and negative for spring.

A regression analysis of scores for pupil compliance with assigned work was performed on each of the three leadership dimensions to test the assumption of linearity. Four of the nine regressions differed significantly from linear. These four regressions are shown in Figures VI-1 through VI-4.

The regression of task scores on spring compliance with assigned work was:

$$Y = -0.466624+0.000047X_T^3 \qquad (6.1)$$

This indicates that increasing values on the task scale are increasingly favorable to this form of compliance.

The regression of spring compliance with assigned work on authority scores indicated that middle authority scores were least favorable to this form of compliance:

$$Y = 0.799025-0.092881X_A+0.000049X_A^3 \qquad (6.2)$$

The regression of the same compliance variable on expressive scale scores was similar to its regression on task scores:

$$Y = -0.43269+0.000017X_E^3 \qquad (6.3)$$

The regression of scores for fall-spring difference in compliance with assigned work on authority is:

$$Y = 0.10524-0.01408X_A+0.00029X_A^2 \qquad (6.4)$$

With the indication of the relationship of the measures of pupil compliance to each of the dimensions of teacher leadership considered separately, a multiple regression analysis of pupil compliance on the three teacher leadership dimensions combined was then performed to examine the assumption that pupil compliance is a linear function of the three dimensions. In these regressions,

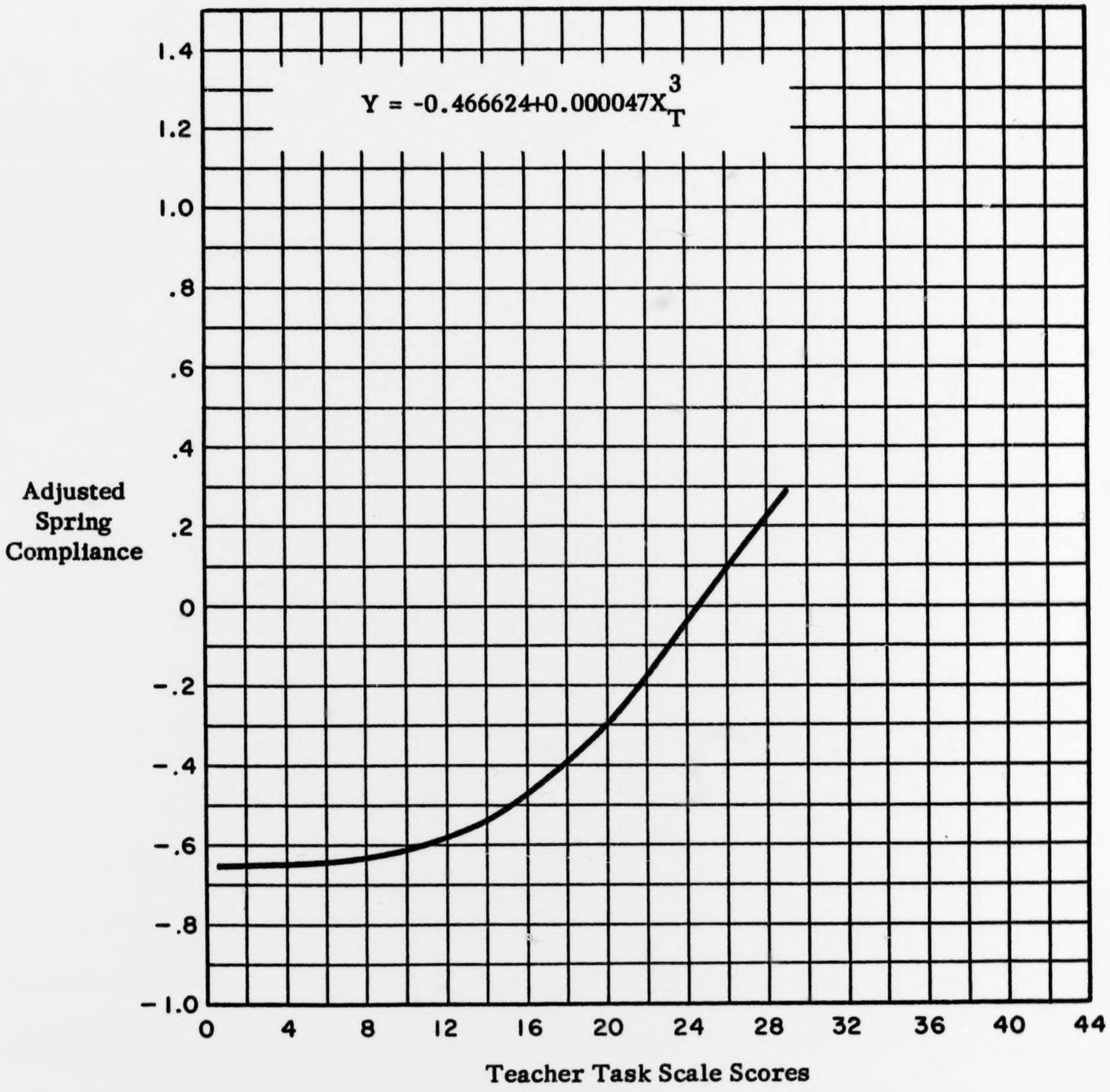

Fig. VI-1. REGRESSION LINE FOR ADJUSTED SPRING PUPIL COMPLIANCE WITH ASSIGNED WORK ON TEACHER TASK SCALE SCORES

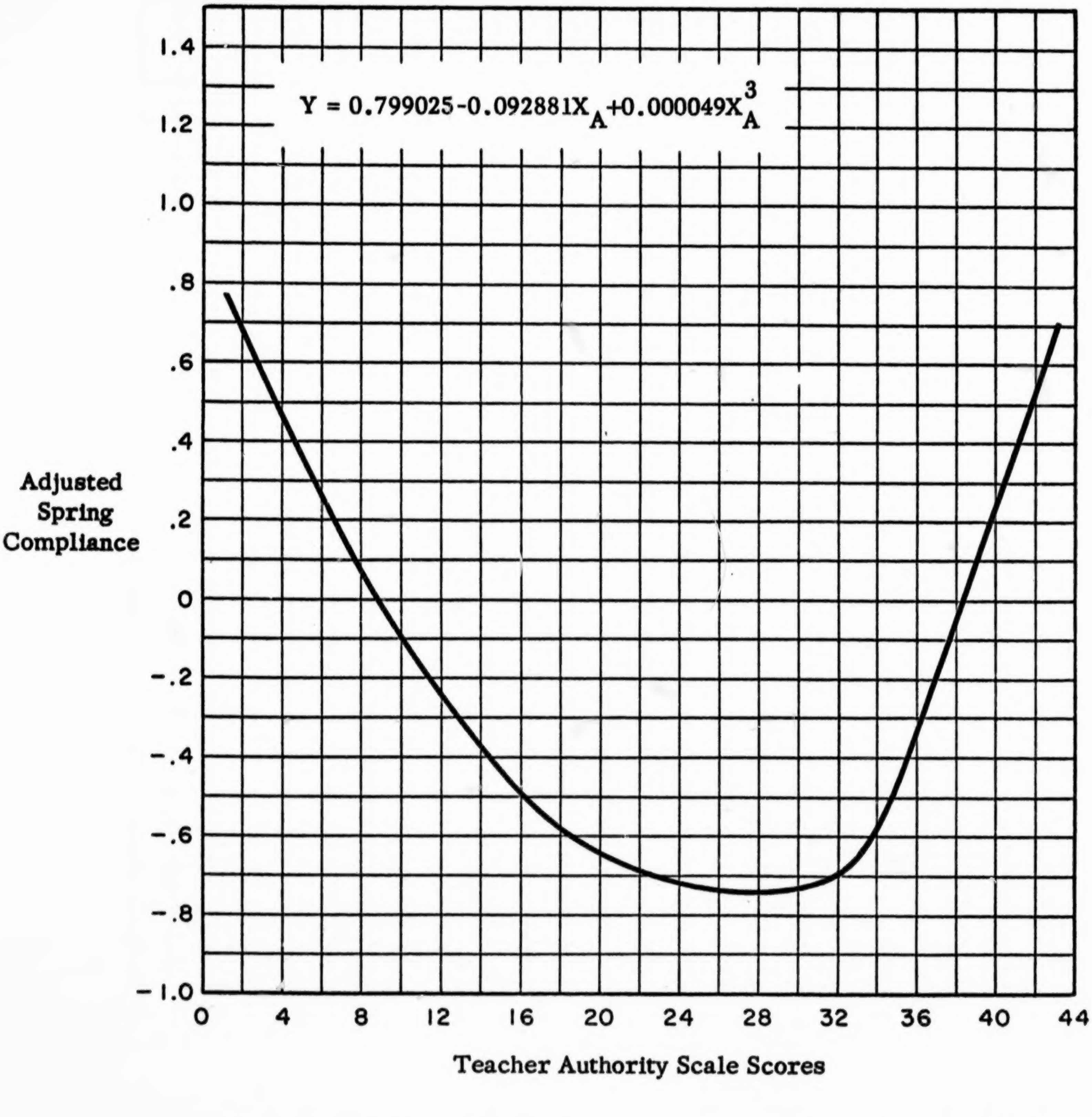

Fig. VI-2. REGRESSION LINE FOR ADJUSTED SPRING PUPIL COMPLIANCE WITH ASSIGNED WORK ON TEACHER AUTHORITY SCALE SCORES

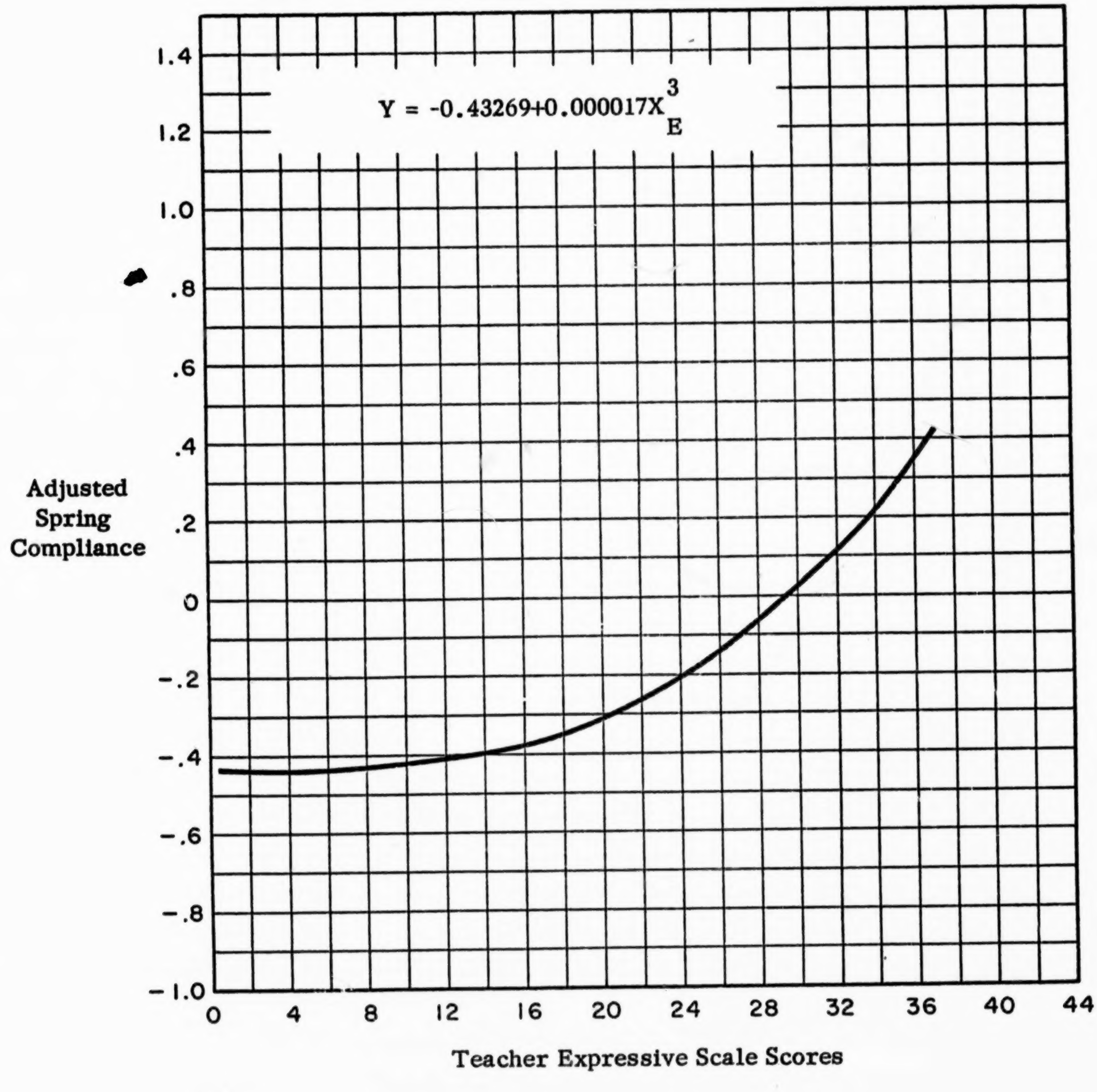

Fig. VI-3. REGRESSION LINE FOR ADJUSTED SPRING PUPIL COMPLIANCE WITH ASSIGNED WORK ON TEACHER EXPRESSIVE SCALE SCORES

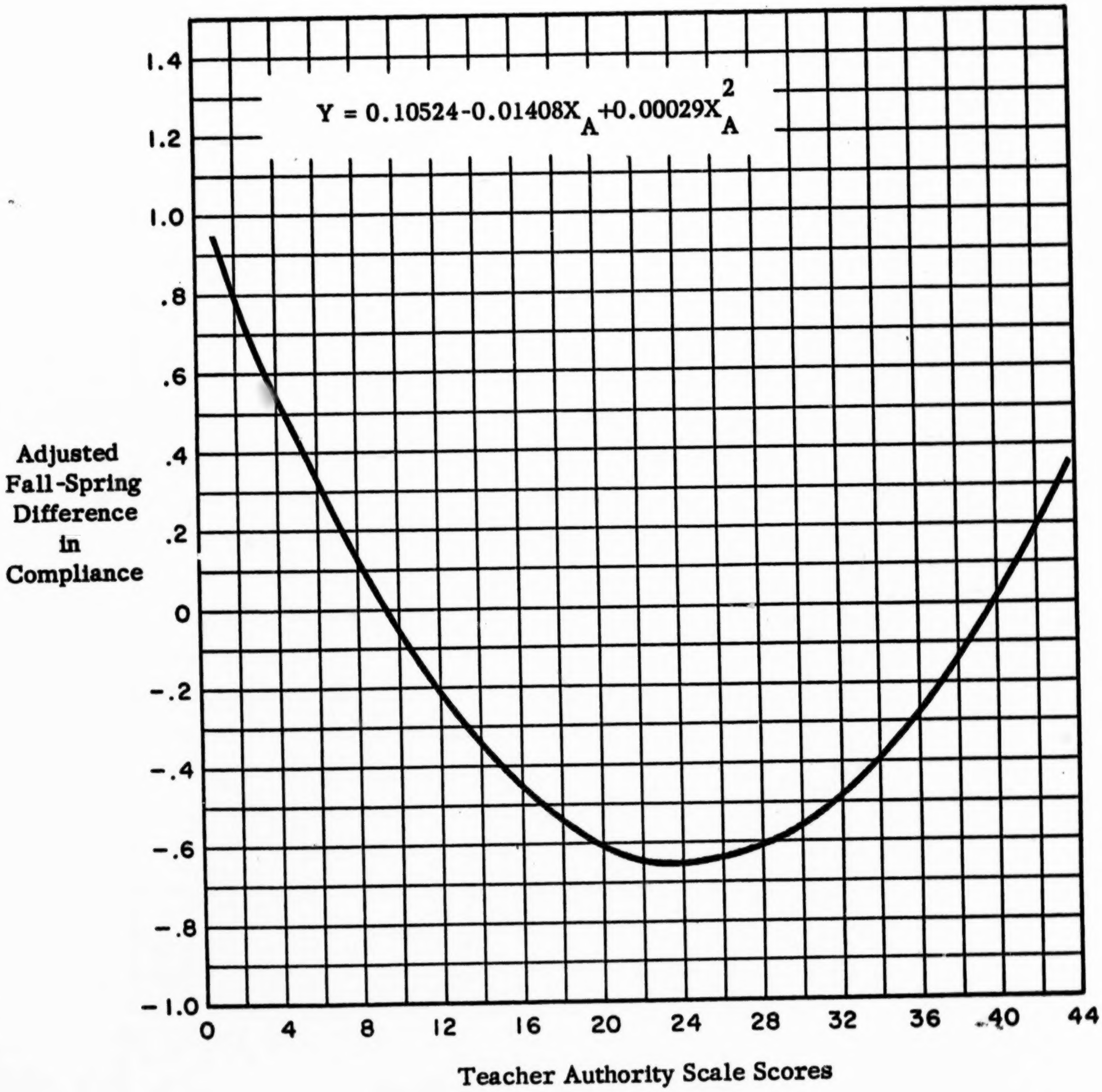

Fig. VI-4. REGRESSION LINE FOR ADJUSTED FALL-SPRING DIFFERENCE IN PUPIL COMPLIANCE WITH ASSIGNED WORK ON TEACHER AUTHORITY SCALE SCORES

any leadership dimension shown to be curvilinearly related to an effect-variable was transformed according to the expression in 6.1 through 6.4. (Tables VI-2, VI-3, and VI-4)

Of the multiple regression correlation coefficients obtained for the three pupil compliance measures on the three combined dimensions of teacher leadership, none showed all three dimensions to be significantly related to any measure. The regression for fall pupil compliance on leadership scale scores with the task and authority scores linear and a transformation of the expressive scores resulted in a non-significant correlation coefficient, R = .25. (Table VI-2)

The multiple regression of spring pupil compliance to assigned work on leadership with all three leadership scale scores transformed resulted in a multiple correlation coefficient of .42 significant at the five percent level produced by the transformed authority and task scores with no improvement in the efficiency of the prediction with the inclusion of the transformed expressive scores. (Table VI-3)

The multiple regression of fall-spring difference in pupil compliance resulted in a correlation coefficient of .34, significant at the five percent level. However, no significant improvement in the efficiency of the prediction resulted from the inclusion of the untransformed task and expressive leadership scale scores. (Table VI-4) Thus, the use of authority, under the assumption of linearity, is the major determinant of the trend in compliance with assignemnts over the year.

These multiple regressions of pupil compliance measures on the three dimensions of leadership, none of which showed all three dimensions contributing

Table VI-2. MULTIPLE REGRESSION ANALYSIS OF FALL ADJUSTED PUPIL COMPLIANCE TO ASSIGNED WORK ON TRANSFORMED TEACHER LEADERSHIP SCALE SCORES

$$(Y = -0.65979+0.00128X_T+0.01615X_{PE}+0.00193X_A)$$

Leadership Scores	df	Mean Squares	F
Task	1	.02864	2.35
Expressive (transformed)	1	.00524	.43
Authority	1	0.02388	1.97
Due to Regression	3	0.01925	1.59
Deviation from Regression	70	0.01210	1.97

Multiple Correlation Coefficient = .25

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[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3,70} \geq 2.74) = .05$

Table VI-3. MULTIPLE REGRESSION ANALYSIS OF ADJUSTED SPRING PUPIL COMPLIANCE TO ASSIGNED WORK ON TRANSFORMED TEACHER LEADERSHIP SCALE SCORES

$$(Y = -1.00664+0.00857X_{PA}+0.00768X_{PT}+0.00414X_{PE})$$

Leadership Scores	df	Mean Squares	F
Authority (transformed)	1	.14784	9.31[a]
Task (transformed)	1	.07003	4.63[b]
Expressive (transformed)	1	.00981	.65
Due to Regression	3	.07589	4.99[c]
Deviation from Regression	70	.01520	

Multiple Correlation Coefficient = .42

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[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3,70} \geq 4.08) = .01$

Table VI-4. MULTIPLE REGRESSION ANALYSIS OF ADJUSTED FALL-SPRING DIFFERENCE IN PUPIL COMPLIANCE TO ASSIGNED WORK ON TRANSFORMED TEACHER LEADERSHIP SCALE SCORES

$(Y = -0.2596+1.02244X_{PA}+0.00032X_{T}-0.00016X_{E})$

Leadership Scores	df	Mean Squares	F
Authority (transformed)	1	.15085	9.40^a
Task	1	.00027	.02
Expressive	1	.00017	.01
Due to Regression	3	.05043	3.06^d
Deviation from Regression	70	.01651	

Multiple Correlation Coefficient = .34

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[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3,70} \geq 4.08) = .01$

[d] $P(F_{3,70} \geq 2.74) = .05$

significantly to the prediction, indicate either that all three dimensions are not necessary to predict pupil compliance, or that the effects of the three are not additive as seemed to be the case for learning gain discussed in Chapter IV. To examine the latter alternative the following hypothesis was explored:

> Hypothesis VI-2. Pupil compliance is a function of the three combined dimensions of teacher leadership with the effect of a given level of performance on any one dimension depending on the level of performance on the other two dimensions.

With the low and unequal cell frequencies observed, a rigorous test of the interaction hypothesis is not possible. A Kruskal-Wallis test of the significance of the differences of the means for pupil compliance among teacher leadership modes (the modes established on the basis of total learning gain scores) resulted in values of H which were not significant for any of the three measures. (Tables VI-5, VI-6, and VI-7)

Relationship between a Leadership Dimension and Pupil Compliance when Controlling Other Two Dimensions

The lack of evidence of over-all significance of the difference among the leadership modes might suggest that the regression analysis adequately described the data, that is, that some dimensions of teacher leadership added little to the prediction of compliance scores. It was still of interest to examine the variations in the effect of a given dimension of teacher leadership on pupil compliance with the other two dimensions controlled. Such an examination provides some evidence for the acceptance or rejection of the assumption of linearity of the regression of compliance on the leadership dimensions.

Table VI-5. MEANS FOR ADJUSTED FALL PUPIL COMPLIANCE TO ASSIGNED WORK BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				-0.07		
		N				17		
	Middle (12-28)	$\bar{X}$	0.13	-1.02	-0.49	-0.21	-0.45	0.13
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-0.92	-0.94	0.02		0.42	0.32
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 6.28$; $P(H_{11} \geq 19.68) = .05$

Table VI-6. MEANS FOR ADJUSTED SPRING PUPIL COMPLIANCE TO ASSIGNED WORK BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				0.024		
		N				17		
	Middle (12-28)	$\bar{X}$	-0.18	-1.70	0.02	0.29	-0.98	-0.06
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-1.12	-1.33	0.53		0.24	0.10
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 11.68$; $P(H_{12} \geq 19.68) = .05$

Table VI-7. MEANS FOR ADJUSTED FALL-SPRING DIFFERENCE IN PUPIL COMPLIANCE TO ASSIGNED WORK BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				0.35		
		N				17		
	Middle (12-28)	$\bar{X}$	-0.06	-0.57	1.56	0.70	-0.79	0.11
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	0.07	-0.44	0.71		-0.66	-0.33
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 12.59$; $P(H_{11} \geq 19.68) = .05$

Relationship of the task dimension to pupil compliance with the authority and expressive dimensions controlled. The regression analysis indicated that task scale scores were the most effective in predicting pupil compliance with assigned work in the fall with task scores and compliance scores correlated.

A comparison of parallel cells in the low task segment of Table VI-5 with the middle and high task segment where comparable cells exist reveals that only for teachers using middle expressive behavior with low authority was middle or high task behavior associated with less pupil compliance than was found for low task teachers in the fall.

While the spring pupil compliance with assigned work tended to increase as the cube of the task score, there were two combinations of authority and expressive levels for which low task scores were associated with higher pupil compliance than higher task scores. (Table VI-6) These were middle expressive with high authority modes and low expressive with middle authority modes.

While the linear correlation between task scores and compliance difference scores was low but positive, that is, indicated that high task scores were associated with increases in compliance while low task scores were associated with decrease in compliance, only those middle and high task teachers who were also middle expressive and low authority were able to maintain pupil compliance with assignments better than low task teachers. (Table VI-7) In all other combinations of expressive and authority behavior, low task behavior resulted in maintenance of greater pupil compliance with assignments than did high task behavior.

This analysis indicated that the effect of a given level of task behavior on compliance tended to be different depending on the level of expressive and authority behavior employed.

Relationship of the authority dimension to pupil compliance with the task and expressive dimensions controlled. The curvilinear regression on authority scores with lowest compliance scores in the middle ranges of authority, noted for each of the three measures of pupil compliance with assigned work, was found to appear whatever the combination of task and expressive behaviors the teacher might employ.

By spring the teachers with low task behavior were obtaining the highest compliance with high authority, while the teachers in the middle and high ranges of task behavior were obtaining the highest compliance with low authority. (Compare three-celled rows in Table VI-5 through Table VI-7)

Relationship of the expressive dimension to pupil compliance with the task and authority dimensions controlled. The regression analysis of the three compliance variables on expressive scale scores obscured some important aspects of the relationship between these variables and expressive scores because all teachers scoring high on the expressive scale - - teachers we assume are employing large amounts of positive affect in dealing with pupils - - were characterized as low in their use of authority and middle or high in their emphasis on the learning task. Conversely, no teachers in these ranges of the task and authority dimensions were characterized as low in the expressive dimension.

When the columns of Tables VI-5 through VI-7 are compared, it is found that, in fact, the greater the use of expressive behavior, the less compliance was obtained except for teachers using low authority. By spring only those teachers with low task and low authority scores were obtaining greater compliance with higher expressive scores. However, the teachers with middle expressive, high task, and low authority scores were obtaining the highest compliance scores in spring, with those employing the high expressive, high task, and low authority mode ranking next.

This examination of the relationship between the expressive dimension of teaching style and compliance variables seemed to indicate that the expressive dimension did not have greater predictive power in the regression analysis because of its interaction with the authority dimension. This was true to some degree with respect to the task dimension. The authority dimension, on the other hand, remained adequately described by the regression equations when the remaining dimensions were held constant.

Pupil Volunteer Work as a Measure of Compliance

Pupil voluntary work, the term "voluntary" notwithstanding, was regarded as an indicator of pupil compliance and was assumed to be in part a function of teacher leadership. The measurement of voluntary work as a variable was discussed in Chapter II. The following hypothesis represents the assumption held for the study of this variable as related to leadership dimensions.

Hypothesis VI-3. The task and expressive dimensions of teacher leadership are positively related to pupil volunteer work in both fall and spring. The authority dimension is negatively related to volunteer work in both fall and spring.

The zero-order correlations indicate that the direction of all relationships were generally as predicted. (Table VI-8) Four of the six predictions for fall and spring were statistically significant at the five percent level or better. No prediction was made for the change in voluntary work between fall and spring.

A regression analysis was performed to explore the assumption of linearity of the relationship between voluntary work and each dimension of teacher leadership. Three of the regressions differed significantly from linear when logarithmic and polynomial transformations up to the third degree were tested for each leadership dimension. (Figures VI-5 to VI-7) The equations for these regressions are as follows:

The regression of spring volunteer work on authority indicated that the greatest amount of volunteer work was obtained with the least authority, the difference between low and middle authority being greater than the difference between middle and high authority.

$$Y = 0.51854-0.19378 \log X_A \qquad (6.6)$$

Fall volunteer work on polynomial expressive.

$$Y = 1.15471+0.25466X_E-0.01047X_E^2+0.00021X_E^3 \qquad (6.7)$$

Table VI-8. ZERO-ORDER CORRELATIONS BETWEEN TEACHER LEADERSHIP SCALE SCORES AND PUPIL VOLUNTEER WORK SCORES

Leadership Scores	Volunteer Work Scores		
	Fall	Spring	Fall-Spring Difference
Task	.18[a]	.12[b]	-.10
Authority	-.04	-.21[a]	-.11[b]
Expressive	.03	.29[a]	.17[b]

[a] $P(r_{74} = .15) = .01$ (one-tailed test)

[b] $P(r_{74} = .11) = .05$ (one-tailed test)

Fall-spring difference in volunteer work on polynomial expressive.

$$Y = 1.17699 - 0.27094X_E + 0.01484X_E^2 - 0.00021X_E^3 \qquad (6.8)$$

The other regressions of volunteer work showed non-linear tendencies below the five percent level of significance.

With the above understanding of the relationship of each of the separate teacher leadership dimensions to pupil volunteer work, a multiple regression analysis was employed to determine whether it was a linear function of the three

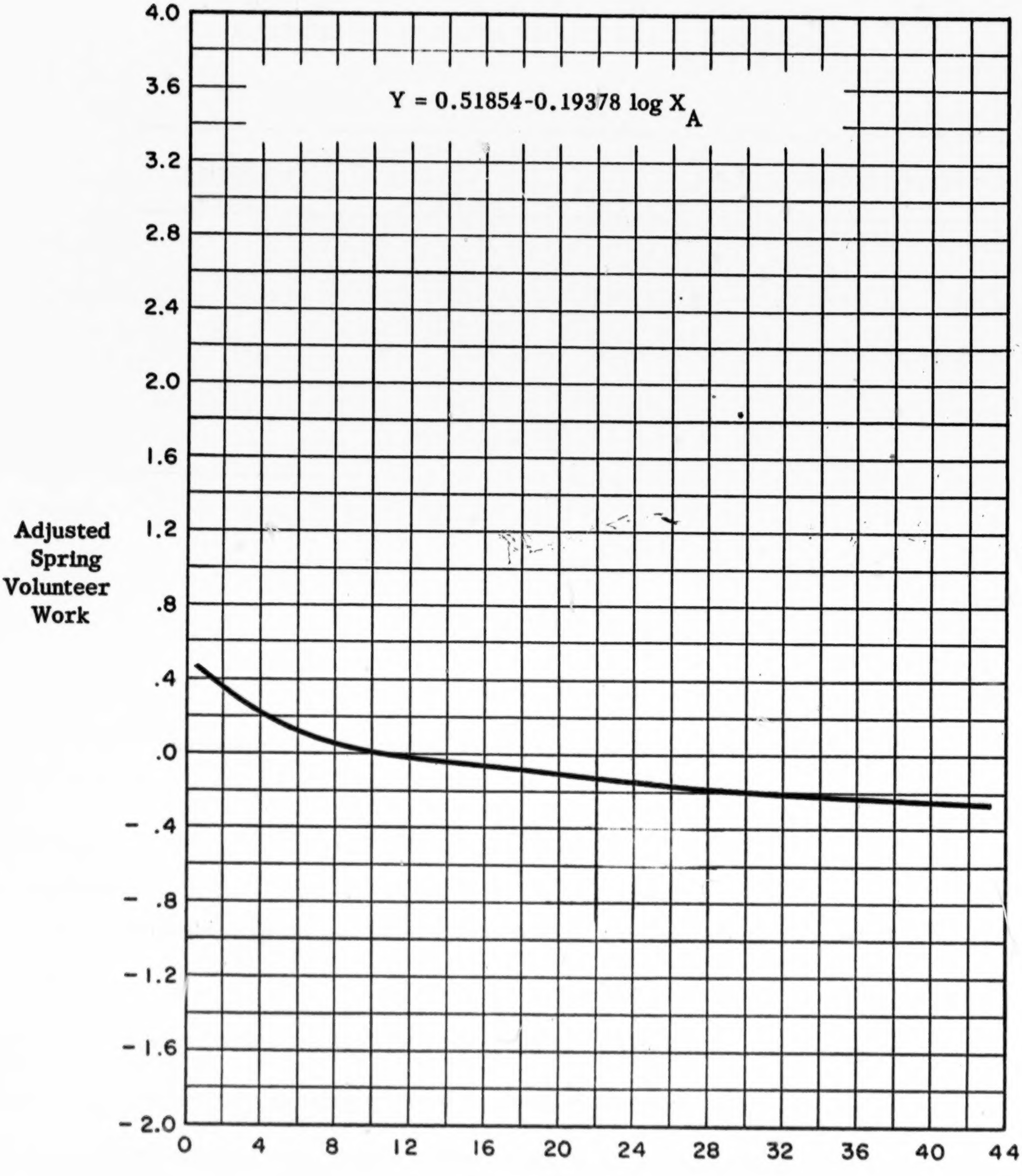

Fig. VI-5. REGRESSION LINE FOR ADJUSTED SPRING PUPIL VOLUNTEER WORK ON TEACHER AUTHORITY SCALE SCORES

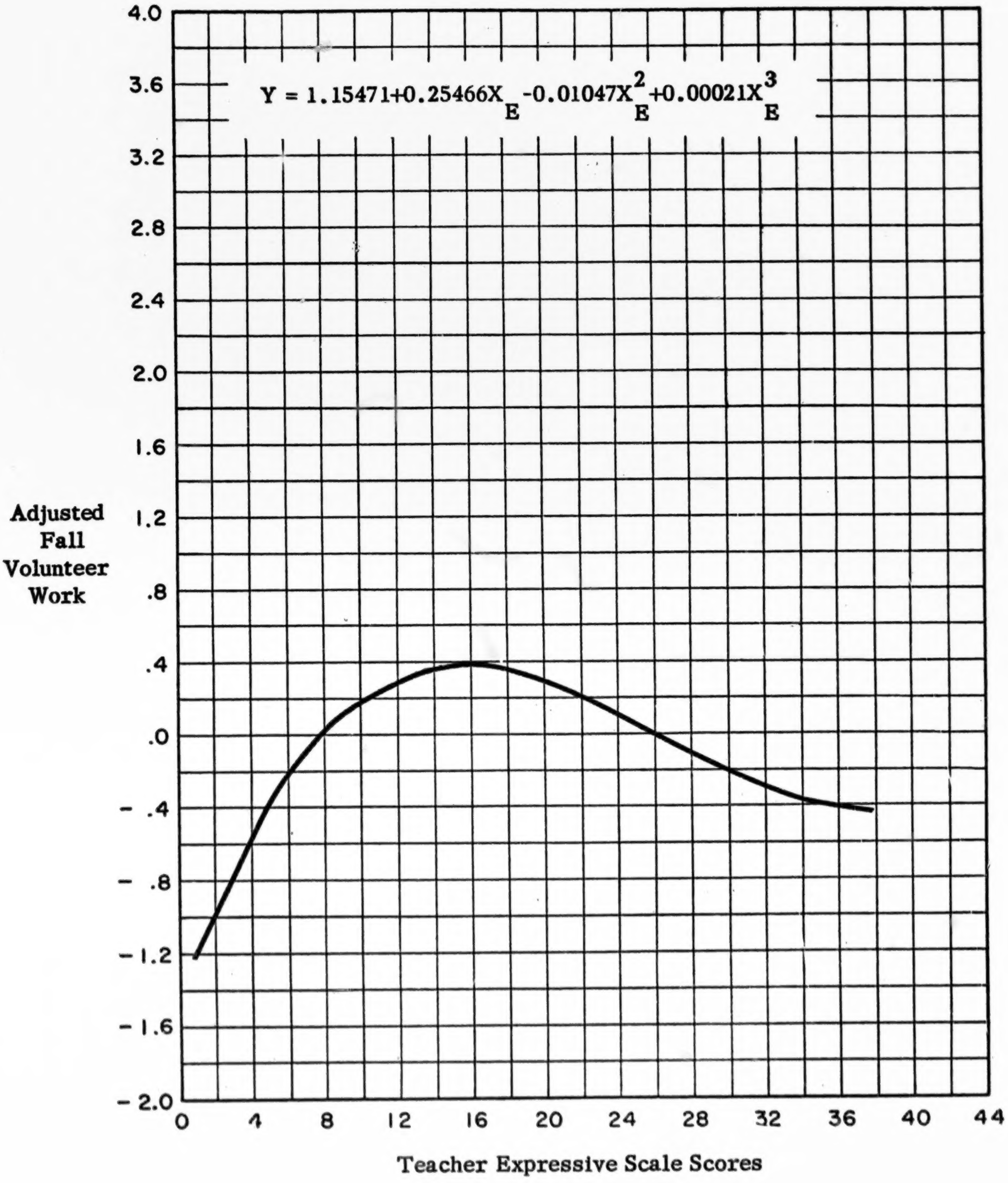

Fig. VI-6. REGRESSION LINE FOR ADJUSTED FALL PUPIL VOLUNTEER WORK ON TEACHER EXPRESSIVE SCALE SCORES

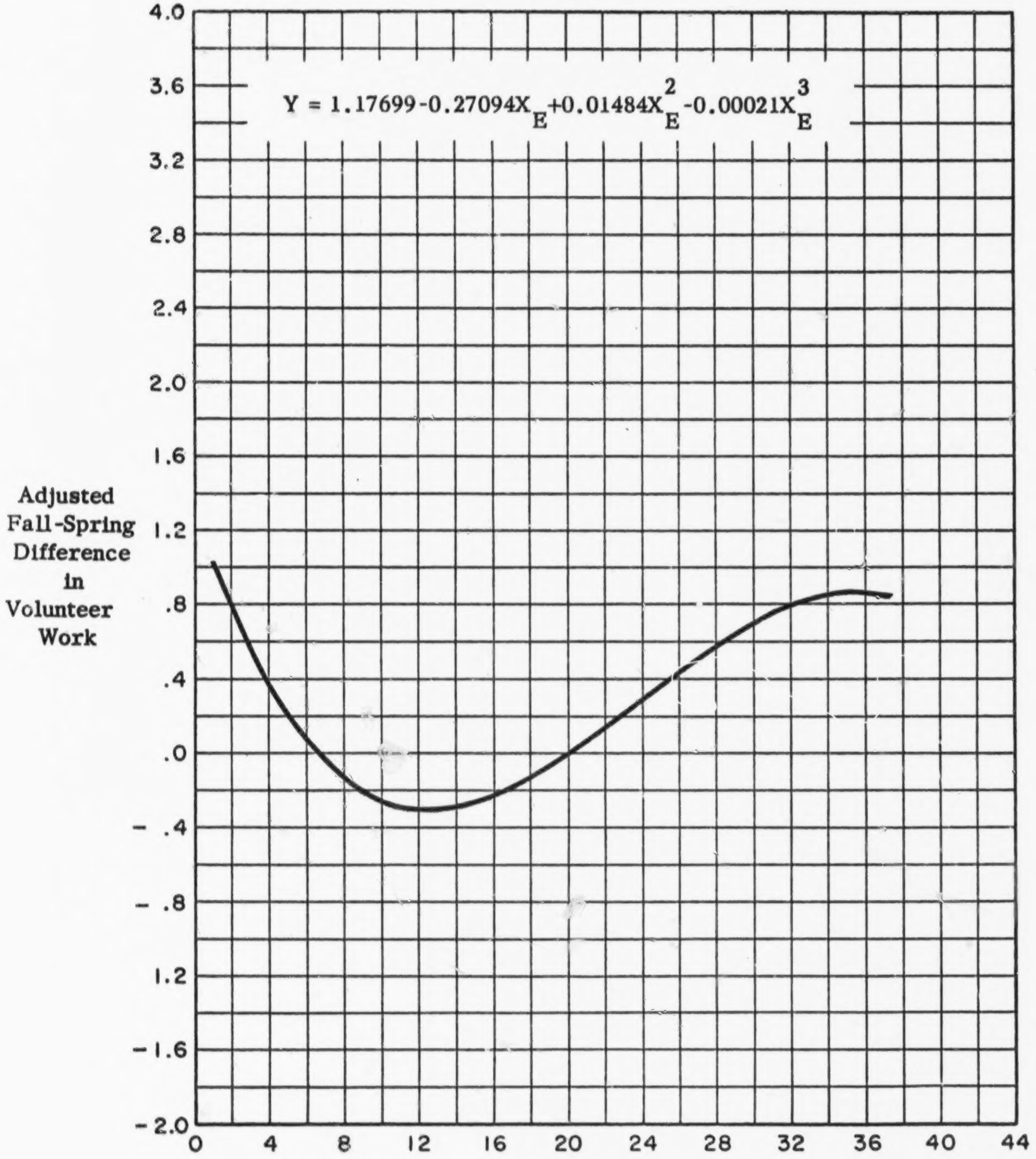

Fig. VI-7. REGRESSION LINE FOR ADJUSTED FALL-SPRING DIFFERENCE IN PUPIL VOLUNTEER WORK ON TEACHER EXPRESSIVE SCALE SCORES

leadership dimensions. (Tables VI-9, VI-10, and VI-11) In these regressions a leadership dimension shown to be curvilinearly related to a volunteer work variable was transformed according to the above expressions (6.6 to 6.8). Only the expressive dimension was significantly related to fall and spring volunteer work with neither of the other two contributing to the efficiency of the prediction. None of the dimensions was significantly related to the fall-spring difference scores for volunteer work.

To examine whether the task and authority dimensions were actually producing no effect on pupil volunteer work or whether the influence was being obscured by the non-linear nature of the relationship, an analysis of the relationship of the modes of teacher leadership to pupil volunteer work was performed similar to those which were done for pupil gain, morale, and compliance.

> Hypothesis VI-4. Pupil volunteer work is a function of the three combined dimensions of teacher leadership with the effect of a given level of performance on any one dimension depending on the level of performance of the other two dimensions.

This hypothesis was explored by a test of the differences of the mean scores for pupil volunteer work by teacher leadership modes (the modes established on the basis of total learning gain). (Tables VI-12, VI-13, and VI-14) The value of H obtained from this test was at significance for fall, H = 19.36, but not significant for spring, H = 12.70. For fall-spring difference H = 15.78. This indicates that fall volunteer work is more a function of the interaction than spring volunteer work; when the effect of the expressive dimension appears, it

Table VI-9. MULTIPLE REGRESSION ANALYSIS OF ADJUSTED FALL PUPIL VOLUNTEER WORK ON TRANSFORMED TEACHER LEADERSHIP SCALE SCORES

$$(Y = 0.48559+0.86590X_{PE}+0.00135X_{A}+0.01570X_{T})$$

Leadership Scores	df	Mean Squares	F
Expressive (transformed)	1	11.7415	8.67[a]
Task	1	1.19452	.88
Authority	1	0.01970	.01
Due to Regression	3	4.31856	3.13929[d]
Deviation from Regression	70	1.37565	

Multiple Correlation Coefficient = .34

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[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3,70} \geq 4.08) = .01$

[d] $P(F_{3,70} \geq 2.74) = .05$

Table VI-10. MULTIPLE REGRESSION ANALYSIS OF ADJUSTED SPRING PUPIL VOLUNTEER WORK ON TRANSFORMED TEACHER LEADERSHIP SCALE SCORES

$$(Y = 0.52083+0.01782X_E+0.56187X_{LogA})$$

Leadership Scores	df	Mean Squares	F
Expressive	1	4.36597	6.65[b]
Authority (transformed)	1	.72042	1.10
Task			d
Due to Regression	2	2.54	3.88[c]
Deviation from Regression	71	.65552	

Multiple Correlation Coefficient = .31

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[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{2,70} \geq 3.13) = .05$

[d] F ratio for partial correlation on Y is less than .01.

Table VI-11. MULTIPLE REGRESSION ANALYSIS OF ADJUSTED FALL-SPRING PUPIL VOLUNTEER WORK DIFFERENCE ON TRANSFORMED TEACHER LEADERSHIP SCALE SCORES

$(Y = 3.76282 - 0.00760X_A - 0.01960X_T - 0.03210X_{PE})$

Leadership Scores	df	Mean Squares	F
Authority	1	1.01890	.83
Task	1	1.11330	.91
Expressive (transformed)	1	1.14491	.93
Due to Regression	3	1.09	.89
Deviation from Regression	70	1.22598	

Multiple Correlation Coefficient = .19

$^a P(F_{1,70} \geq 7.01) = .01$

$^b P(F_{1,70} \geq 3.98) = .05$

$^c P(F_{3,70} \geq 2.74) = .05$

Table VI-12. MEANS FOR ADJUSTED FALL PUPIL VOLUNTEER WORK BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				-0.39		
		N				17		
	Middle (12-28)	$\bar{X}$	-0.26	-1.42	0.91	0.77	0.25	0.65
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	-1.11	-1.13	-0.78		-0.43	0.00
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 19.36$; $P(H_{11} \geq 19.68) = .05$

Table VI-13. MEANS FOR ADJUSTED SPRING PUPIL VOLUNTEER WORK BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\overline{X}$				0.17		
		N				17		
	Middle (12-28)	$\overline{X}$	0.13	0.05	-0.95	0.28	0.07	0.10
		N	6	2	1	14	11	8
	Low (0-8)	$\overline{X}$	-0.56	-0.68	-0.33		-1.02	-0.11
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 12.70$; $P(H_{11} \geq 19.68) = .05$

Table VI-14. MEANS FOR ADJUSTED FALL-SPRING DIFFERENCE IN PUPIL VOLUNTEER WORK BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				.76		
		N				17		
	Middle (12-28)	$\bar{X}$	0.61	0.86	-1.63	-0.23	0.04	-0.19
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	.09	0.90	0.71		-0.18	-0.22
		N	1	4	3		2	5

Kruskal-Wallis Test: $H = 15.78$; $P(H_{11} \geq 19.68) = .05$

may be the overriding influence. This explanation would seem to minimize too greatly the actual contribution of the task and authority dimensions.

Relationship between a Leadership Dimension and Pupil Volunteer Work when Controlling Other Two Dimensions

To examine this problem more carefully, the effect of the variation of each dimension on pupil volunteer work was examined with the other two dimensions controlled. Generally, the regressions of volunteer work on the dimensions were:

1. Linear positive for fall and spring and linear negative for fall-spring difference on task scores.
2. Linear negative for fall volunteer work and fall-spring difference on authority. However, a curvilinear tendency short of significance with middle authority most unfavorable was noted in both instances.
3. Negative for spring volunteer on authority, leveling off with higher authority in a logarithmic curve. (6.6)
4. Curvilinear for fall on expressive with middle expressive high (6.7)
5. Linear positive for spring on expressive.
6. Curvilinear for fall-spring difference on expressive scores with middle expressive scores low. (6.8)

Relationship of the task dimension to pupil volunteer work with the authority and expressive dimensions controlled. The linear positive relationship of task behavior to both fall and spring volunteer work held for all modes with two exceptions, the one with high authority and middle expressive for fall and the one with high authority and low expressive for spring. The linear negative relationship of task to fall-spring difference was observed also with only one exception, the mode with high authority and middle expressive behavior. (See Tables VI-12, VI-13, and VI-14, and compare parallel cells in low task and middle and high task segments of tables) These findings seemed to indicate that the simultaneous use of high authority and high task behavior tended to be adverse to voluntary pupil activities.

Relationship of authority to pupil volunteer work with the task and expressive dimensions controlled. The relationship of authority to pupil volunteer work with the task and expressive dimensions controlled was almost consistently curvilinear for all three measures. (Tables VI-12, VI-13, and VI-14) High authority obtained higher scores on fall volunteer work than low authority for low task teachers, but obtained lower scores for high task teachers. Comparison was only possible, however, for the mode with middle expressive behavior in the latter case. The so-called "voluntary" activity is related to the compliance structure of authority which is most apparent in the early part of the school year; this type of compliance declines by spring.

In spring also, middle authority generally resulted in the least volunteer work. The exception being for low task and middle expressive teachers for whom high authority effected lower voluntary work scores. High authority produced also lower scores than low authority except for the low-expressive, low task teacher.

For the fall-spring difference scores, middle authority obtained higher scores for all modes. Since the fall scores for these modes were very low, it was difficult for the amount of volunteer work to decline greatly.

Relationship of the expressive dimension to pupil volunteer work with the task and authority dimensions controlled. Middle expressive modes, in almost all cases, effected higher scores on pupil volunteer work than low expressive modes, as predicted by the regression analysis. (Compare columns of Tables VI-12 and VI-13) No mean score for low expressive modes was positive. All high task modes using middle expressive obtained mean scores higher than the mean score for the total sample and higher than low expressive modes. For low task teachers, middle expressive modes were not clearly more favorable with respect to encouraging voluntary work. In both fall and spring the high expressive mode observed with middle and high task only obtained lower scores in this regard than the parallel mode employing middle expressive behavior. The positive linear regression for spring volunteer work was not observed for modes with middle and high task and low authority; here middle expressive behavior effected higher voluntary work scores than high expressive.

The regression for fall-spring difference in pupil compliance on expressive scores appeared to describe the relationship for the three pairs of modes involving high task, with middle and high expressive modes maintaining volunteer work at a higher level than low expressive modes. Again, for the low task teacher, middle expressive behavior is more favorable to the maintenance of voluntary activities only when accompanied by low authority, that is, when expressive behavior is the only leadership dimension brought into play.

Although the evidence for over-all significance of the difference in pupil volunteer work among the modes was not strongly indicated except for fall, the above analysis presents some evidence that all three teacher leadership dimensions do contribute to the prediction and that, especially, differences in the effects of the levels of authority and expressive scores accompanying different levels of task commitment obscured the contribution of task and authority in the multiple regression.

Class Order as a Measure of Pupil Compliance

It was assumed that classroom order would be a useful measure of pupil compliance as a function of teacher leadership and would vary accordingly. The measurement of classroom order was discussed in Chapter II.

> Hypothesis VI-5. The task and expressive dimensions of teacher leadership are positively related to classroom order. The authority dimension is negatively related to classroom order.

The zero-order correlation of the leadership dimensions with general class order scores and each of the three classroom order measures which composed the general class order index all suggested that these relationships were as predicted. (Table VI-15) For the general class order index, the only measure given further analysis here, the highest correlation coefficient was with task behavior; that with authority was in the predicted direction though not significant; and the relationship with expressive scores was also highly significant.

A regression analysis was made testing the linear assumption against the assumption of logarithmic or polynomial (in the third degree) regressions of each of the three leadership dimensions on the general class order index.

Table VI-15. ZERO-ORDER CORRELATIONS BETWEEN TEACHER LEADERSHIP SCALE SCORES AND SPRING CLASSROOM ORDER SCORES

Leadership Scores	Spring Class Order My Conduct	 Class Interrupted	 Class Conduct	 General Class Order
Task	$.50^a$	$.30^a$	$.41^a$	$.47^a$
Authority	$-.11^b$	$-.05$	$-.08$	$-.05$
Expressive	$.42^a$	$.33^a$	$.26^a$	$.33^a$

[a] $P(r_{74} = .15) = .01$ (one-tailed test)

[b] $P(r_{74} = .11) = .05$ (one-tailed test)

The regression of general class order on the expressive dimension was the only one which differed significantly from linear. The equation was as follows:

$$Y = 34.63951+0.02483X_E^2 \qquad (6.9)$$

This equation indicated that the regression was curvilinear on expressive scores with the highest being increasingly favorable to class order.

There being an indication of the relationship of each of the dimensions of teacher leadership to general class order, the multiple regression of class order as a linear function of the three dimensions was obtained, using the above expression to transform expressive scores. (Table VI-16) This regression showed task to be a major influence on general class order with the expressive and authority scores

Table VI-16. MULTIPLE REGRESSION ANALYSIS OF GENERAL CLASS ORDER ON TEACHER LEADERSHIP SCALE SCORES

$$(Y = -21.31076 + 1.57275X_T + 0.80034X_{PE} + 0.40300X_A)$$

Leadership Scores	df	Mean Squares	F
Task	1	19484.67	20.95[a]
Expressive (transformed)	1	2224.40	2.44
Authority	1	1146.51	1.26
Due to Regression	3	7618.53	8.38[c]
Deviation from Regression	70	908.63	

Multiple Correlation Coefficient = .51

[a] $P(F_{1,70} \geq 7.01) = .01$

[b] $P(F_{1,70} \geq 3.98) = .05$

[c] $P(F_{3,70} \geq 4.08) = .01$

[d] $P(F_{3,70} \geq 2.74) = .05$

contributing nothing to the efficiency of the prediction. Rather than assume that task was the only dimension related to general class order, it was assumed that interaction among the dimensions obscured the effect of the expressive and authority dimensions. Accordingly, the following hypothesis was tested:

> Hypothesis VI-6. General class order is a function of the three combined dimensions of teacher leadership with the effect of a given level of performance on any one dimension depending on the level of performance on the other two dimensions.

A test of significance of the difference of the means by teacher leadership modes resulted in a value of H = 18.57 approaching significance at .05. (Table (VI-17)

Relationship between a Leadership Dimension and General Class Order when Controlling Other Two Dimensions

The regressions of general class order on each of the dimensions of leadership were generally:

> Linear positive with task.
>
> Linear negative with authority.
>
> Curvilinear with expressive, with higher expressive increasingly favorable. (6.9)

The relationship of task behavior to general class order showed middle and high task to obtain equal or higher class order scores than low task in all cases. (Table VI-17)

Table VI-17. MEANS FOR SPRING GENERAL CLASSROOM ORDER BY TEACHER LEADERSHIP MODES, 74 BAY CITY TEACHERS (Modes were defined by combining leadership scale scores in relation to Adjusted Total Gain on three STEP Tests, Reading, Writing, and Mathematics)

TASK			Low (0-4)			Middle and High (7-28)		
AUTHORITY			Low (0-13)	Middle (16-27)	High (30-42)	Low (0-13)	Middle (16-27)	High (30-42)
EXPRESSIVE	High (31-36)	$\bar{X}$				65.6		
		N				17		
	Middle (12-28)	$\bar{X}$	22.8	36.0	1.0	53.6	41.7	65.5
		N	6	2	1	14	11	8
	Low (0-8)	$\bar{X}$	36.0	18.5	33.0		18.5	48.8
		N	1	4	3		2	5

Mean: 62.05; Kruskal-Wallis Test: $H = 18.57$; $P(H_{11} \geq 19.68) = .05$

Low authority produced higher scores than high authority with the exception of the mode with middle expressive and middle and high task; the middle authority mode generally produced the lowest scores. The relationship between authority and order appeared to depend on the level of affect employed by the teacher; however, evidence of the complex relationship observed was not available because of the low cell frequencies at some points of variation from the over-all pattern.

Expressive behavior was positively correlated with the achievement of classroom order for high task teachers at each level of authority. For low task teachers, however, middle expressive was more effective than low in maintaining order only for middle authority teachers. Thus, it appears probable that the influence of the expressive dimension on classroom order is not additive so that its influence was obscured by the linear regression.

In general, the dimension of task contributes to compliance; expressive contributes to compliance only when it is supporting a task commitment and in order to activate compliance which is an end in itself, i.e., low task teacher, and which is being supported by authority. Middle authority generally produces lower compliance.

CHAPTER VII

CONCLUSIONS: THE EFFECTS OF TEACHER LEADERSHIP

Pupil productivity, morale, and compliance have been analyzed as functions of teacher leadership independent of the question of whether or not the behavior of the teacher which was favorable to one of these effects in pupil behavior would also be favorable to another type of effect. The problem of interrelationship of the effect variables as a function of teacher leadership will be considered in this chapter, with respect specifically to the question: Does the teacher who achieves the greatest total learning gain also achieve high morale or compliance? No hypothesis concerning the over-all effects of teacher leadership was proposed although the general tendencies of the relationship of leadership to each of the dependent variables was predicted, and thus the degree of agreement among effect as a consequence of teacher leadership behavior was largely also predicted.

The zero-order correlations among the five major variables of pupil effects are shown in Table VII-1. Six of the 10 were significant at the five percent level or better. Gain and compliance with assigned work were positively related, but gain was not significantly related to either morale or class order. Spring general morale was positively related to compliance, volunteer work, and class order. Compliance with assignments was related to class order as well as gain. The non-significant tendencies of gain with

Table VII-1. ZERO-ORDER INTERCORRELATIONS AMONG THE VARIABLES MEASURING THE EFFECT OF TEACHER LEADERSHIP ON PUPILS, 74 BAY CITY TEACHERS

	Total Gain	Spring General Morale	Spring Compliance	Spring Volunteer Work	General Class Order
Total Gain		-.04	.27[b]	-.06	.14
Spring General Morale			.33[a]	.29[a]	.35[a]
Spring Compliance				.07	.23[b]
Spring Volunteer Work					.31[a]
Spring General Class Order					

[a] $P(r_{74} = .29) = .01$

[b] $P(r_{74} = .22) = .05$

morale and volunteer work, both negative, and class order, positive, are worth noting.[1]

With some indication of the interrelationship among learning gain, morale, and compliance, the question follows: How are the various effects -- gain, morale, and compliance -- related to the modes of teacher leadership?

The first approach to this question was to measure the multiple correlations among effect variables for the 12 teacher leadership modes. The coefficient of concordance obtained, (W = .47), was significant at the one percent level, indicating that the modes of teacher leadership which produce high scores on one effect variable tend to produce high scores on the rest; and conversely those which produce low scores on one tend to produce low scores on all. The ranks of the teacher leadership modes on the five effect variables are shown in Table VII-2.

With the above indication of the similarity of leadership influence on each of the five pupil effects from the measure of concordance, an "L" test was

---

[1] It will be noted that those effect variables which were most highly interrelated were measured by means of the pupil questionnaire, along with the leadership dimensions, while gain was independently measured. This points to the possibility that a general pupil attitude component may account for some of the correlation found among the former. We were aware of this possibility at the outset of the study, and every effort was made in the formulation of questions, and the administration of the questionnaire to avoid contamination of variables from this source.

Table VII-2. RANK OF TEACHER LEADERSHIP MODES ON TOTAL GAIN, GENERAL CLASS ORDER, SPRING VOLUNTEER WORK, SPRING COMPLIANCE, AND SPRING GENERAL MORALE OF BAY CITY PUPILS

TASK			Low(l) (0-4)			Middle and High (m-h) (7-28)		
AUTHORITY			Low(l) (0-13)	Middle(m) (16-27)	High(h) (30-42)	Low(l) (0-13)	Middle(m) (16-27)	High(h) (30-42)
EXPRESSIVE	High(h) (31-36)					Mode H		
		Total Gain				8		
		Class Order				1		
		Volunteer Work				2		
		Compliance with Assignments				3		
		General Morale				2		
	Middle(m) (12-28)		Mode B	Mode D	Mode F	Mode G	Mode J	Mode L
		Total Gain	3	12	1	2	9	4
		Class Order	9	5.5	12	3	7	2
		Volunteer Work	3	6	11	1	5	4
		Compliance with Assignments	7	12	5	2	9	6
		General Morale	7	1	4	3	8	6
	Low(l) (0-8)		Mode A	Mode C	Mode E		Mode I	Mode K
		Total Gain	11	10	6		5	7
		Class Order	5.5	10.5	8		10.5	4
		Volunteer Work	9	10	8		12	7
		Compliance with Assignments	10	11	1		8	4
		General Morale	12	10	11		9	5

made to determine which pupil effect variable best predicted the order for the remaining set.[2] The values of "L" for this test were:

Pupil Effect	χ^2_L
Spring Volunteer Work	7.78^a
Spring Compliance to Assigned Work	6.02^a
Spring General Morale	4.80^b
Spring General Class Order	4.70^b
Total Gain	1.72

[a] $P(L \geq 5.41) = .01$

[b] $P(L \geq 2.71) = .05$

The order of relationship indicated by the values of "L" indicated that learning gain was least related to the other effect variables and that volunteer work was most highly related. It is perhaps not surprising that those forms of leadership which achieve compliance over and above the demands of the system also tend to maximize compliance with the demands of the system to learn, to work, and to conform to the norms of class order.

One of the fundamental problems of the study, with respect to both theory and data analysis, has been the degree of autonomy of each of the leadership dimensions in producing the various effects on pupils. In each effect variable, there was considerable evidence that this autonomy was not in operation, or, in other words, that teacher leadership modes were more adequate to the description of leadership effect than regressions assuming an additive effect for the leadership dimensions. The question can be extended to consider the question of whether leadership modes show differentiated patterns of effect variables or whether the generally positive multiple rank correlation discussed above provides an adequate model for the description of the total effect of teacher leadership.

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[2] Page, Ellis B., "Ordered Hypotheses for Multiple Treatments: A Significance Test for Linear Ranks," *Journal of American Statistical Association*, 58, (March 1963) 301, 216-230.

Figure VII-1 presents in diagrammatic fashion the findings of the study with respect to the interrelations of the modes and the effect variables. The interrelation of the pupil effect variables are indicated by statistically significant zero-order correlations for the 74 teachers. The 12 teacher leadership modes are designated arbitrarily from A through L as indicated in Table VII-2. A code for the identification of level of performance on the three dimensions is indicated in parenthesis for each mode. For example, $_G$ (m-h:l:m) is the mode which designated middle and high task, low authority, and middle expressive teaching style. The directions of arrows drawn from the modes indicate their relationships to pupil effect variables. For adjusted effect variables, an arrow indicates that the mean for the mode was above the expected score of zero. For unadjusted scores (morale and class order), an arrow indicates that the mean score for the given mode was higher than the mean for the total group of 74 teachers. In the discussion which follows, the contribution of a mode to an effect is designated as "high" under these same conditions.

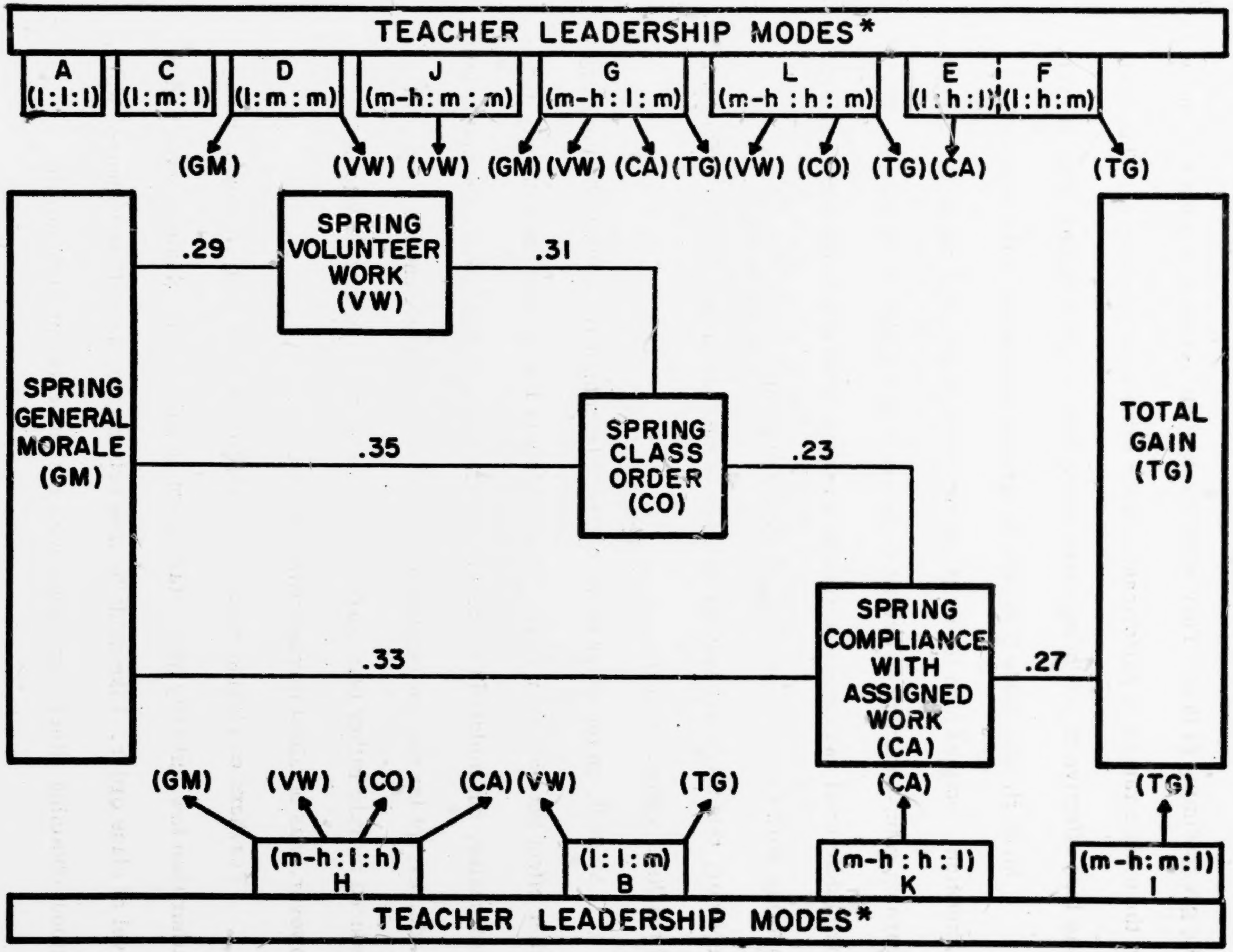
TEACHER LEADERSHIP MODES*
A (l:l:l)
C (l:m:l)
D (l:m:m)
J (m-h:m:m)
G (m-h:l:m)
L (m-h:h:m)
E (l:h:l)
F (l:h:m)
(GM)
(VW) (VW)
(GM) (VW) (CA) (TG)
(VW) (CO) (TG)
(CA)
(TG)
SPRING GENERAL MORALE (GM)
SPRING VOLUNTEER WORK (VW)
SPRING CLASS ORDER (CO)
SPRING COMPLIANCE WITH ASSIGNED WORK (CA)
TOTAL GAIN (TG)
.29
.31
.35
.23
.33
.27
(GM) (VW) (CO) (CA)
(VW) (TG)
(CA)
(TG)
(m-h:l:h) H
(l:l:m) B
(m-h:h:l) K
(m-h:m:l) I
TEACHER LEADERSHIP MODES*

Figure VII-1. RELATIONSHIPS BETWEEN TEACHER LEADERSHIP MODES AND VARIABLES MEASURING EFFECTS ON PUPILS WITH ABOVE-PREDICTED RELATIONSHIPS INDICATED (by arrows); INTERCORRELATIONS AMONG PUPIL-EFFECT VARIABLES.

*Each mode (boxes A to L) is described as to level, high (h), middle (m), and/or low (l), of each of the three dimensions (task, authority, and expressive--in that order).

The teacher leadership mode which best maximized all effects was mode G. Teachers using this mode were high or middle in their emphasis on task and the programming of task. They were low in their reliance on authority and were in the middle ranges of performance on the expressive dimension. This mode was less effective in producing class order than in obtaining any other effect.

Mode H, like mode G except for greater emphasis on the expressive dimension, obtained high levels of performance on all effect measures except learning gain, obtaining somewhat more order in the classroom than G. If the middle level of expressive retains a certain level of tension with regard to meeting work expectations which are vitiated by high levels of expressive behavior, this might account for the lack of success in producing learning gain of teachers using this mode.

Mode B, on the other hand, obtained learning gain without obtaining any other effect but volunteer work. This mode was low on both the authority and task scales, but middle in expressiveness. Thus, it was like G, the maximizing mode, except for the low emphasis on task. Interestingly enough, this shift reduced morale rather than learning gain; what positive morale was obtained, however, was obtained through work satisfaction.

Teachers employing mode L, which differs from G in employing high rather than low authority also obtain learning gain. They obtain an even higher level of class order. Like mode B, they obtain gain, as well as volunteer work, without obtaining either compliance with assignments, or high morale.

Modes E (low task, high authority, low expressive) and F (low task, high authority, and middle expressive) differed from mode G in two dimensions. They obtained only gain and compliance with work assignments. They seem to indicate authority as producing compliance and gain without morale, voluntary work, and/or class order.

Teacher mode D (low task, middle authority, and middle expressive) again differing in two dimensions from mode G, produced effects quite opposite to E and F, obtaining only morale and volunteer work above the expected.

Three teacher modes were high for one effect variable only. Mode I (middle and high task, middle authority, and low expressive) obtained gain. Mode J (middle on all dimensions), differing only in level of expressive from mode I, produced only volunteer work. Mode K (middle or high task, high authority, low expressive), achieved only compliance with assignment.

For two modes none of the effects were high, mode A (low task, low authority, low expressive) and mode C (low task, middle authority, low expressive), indicating that the low everything tendency maximizes nothing.

While there is a general tendency for teacher modes to influence each of the five effect variables in a similar direction, the above analysis indicated noteworthy discrepancies in this general trend. The teacher's adaptation to the classroom as characterized by the modes which combine different levels of performance on the three dimensions was shown to result in a wide range of effects. Mode G tends to maximize all system goals. Some modes maximize several effects, some few, some none.

In general, those modes most like G maximize the larger number of effects. The teachers are coping with the solution of several problems. Mode K, seems to use high authority and low expressiveness to achieve compliance unrelated to gain. Modes A and C appear to be orientations to the teacher's problem rather than those of the system; mode D may be similar with some concern with pupil satisfaction, perhaps because he feels more comfortable with satisfied pupils. A careful scrutiny of the modal content defined in Tables III-8 to III-10 and the effects on pupils provides further insight into the functional connection between teacher behavior and its effects on pupils as proposed in the theory section in Chapter I.

The theories of the study have generally been confirmed. The teacher leadership dimensions, as in the pilot study, were found to be scalable. Significant relationships between teacher leadership and the variables measuring effect on pupils were also established. In some important ways, the findings of the pilot study were replicated. Particularly with respect to the functions of authority some important differences were established.

The advantages of regression analysis enabled us to obtain a clearer understanding of the relationships of leadership dimensions to the effect variables. The evidence provided a basis for the acceptance of the interactional hypothesis that the effect of a given level of performance on any single dimension is dependent on the level of performance in the other two dimensions. The study enables us to specify the teacher leadership styles which maximize the greatest number of effects. Conversely, there is indication that certain teaching modes have little or no utility in terms of the effects investigated.